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# BLOCKCHAIN C CHA(I)NGING THE WORLD,

BLOCK BY BLOCK



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Vineet Bhatnagar- Managing Director and CEO

**EDITORIAL BOARD** Naveen Kulkarni, Manish Agarwalla, Kinshuk Bharti Tiwari, Dhawal Doshi

COVER & MAGAZINE DESIGN Chaitanya Modak, www.inhousedesign.co.in

> **EDITOR** Roshan Sony

RESEARCH Banking, NBFCs Manish Agarwalla, Pradeep Agrawal, Paresh Jain Consumer Naveen Kulkarni, Jubil Jain, Preeyam Tolia Cement Vaibhav Agarwal Economics Anjali Verma, Shruti Bajpai Engineering, Capital Goods Jonas Bhutta, Vikram Rawat Infrastructure & IT Services Vibhor Singhal, Shyamal Dhruve Logistics, Transportation & Midcap Vikram Suryavanshi Midcap & Database Manager Deepak Agarwal Media Manoj Behera Metals & Automobiles Dhawal Doshi, Nitesh Sharma, Yash Doshi Oil & Gas Sabri Hazarika Healthcare & Speciality Chemicals Surya Patra, Mehul Sheth Telecom Naveen Kulkarni, Manoj Behera

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> > TECHNICALS Subodh Gupta

PRODUCTION MANAGER Ganesh Deorukhkar

SR. MANAGER - EQUITIES SUPPORT Rosie Ferns

FOR EDITORIAL QUERIES

PhillipCapital (India) Private Limited No. 1, 18th Floor, Urmi Estate, 95 Ganpatrao Kadam Marg, Lower Parel West, Mumbai 400 013

#### **SALES & DISTRIBUTION**

Ashvin Patil, Shubhangi Agrawal, Kishor Binwal, Bhavin Shah, Ashka Gulati, Archan Vyas

> CORPORATE COMMUNICATIONS Zarine Damania

phillipcapitalindiainstitutionresearch@phillipcapital.in

#### **Ground View - Previous Issues**









1<sup>st</sup> December 2016 Issue 9



1<sup>st</sup> September 2016 Issue 7



1<sup>st</sup> July 2016 Issue 6



1<sup>st</sup> June 2016 Issue 5

#### Letter from the MD

The world of technology is a highly disruptive one. Companies like Kodak, Nokia and Blackberry have demonstrated that a static/stagnant technology company cannot exist. It has to evolve with time, adopt new technologies and discard those rendered obsolete. Blockchain – the parent concept behind the hysteria associated with virtual currency Bitcoin – appears to be one such disruptive technology, in the making.

For long, the world has tried to eliminate time and cost inefficiencies in transaction systems. Blockchain, promises to do both. Little surprise that almost all financial/ technology firms are today exploring the possibilities that it can offer. Our cover story is an on-the-ground status check of this technology and its adoption progress. Our analysts, Vibhor Singhal and Shyamal Dhruve, interacted with multiple stakeholders, technology companies, potential clients, consultants and regulatory authorities – to gauge the level of interest and concerns they have, about the new technology. We also have an exclusive contribution from the leading global technology consultant, Information Services Group (ISG), in the cover story.

It is pretty clear that that Blockchain promises to be one of the (if not THE) most disruptive technologies that the world has ever seen. It is no longer a question of whether the world will adopt it, but when and in what format will it be implemented. Enterprises across the world, have to be on their toes, keeping themselves abreast with latest development in this space – lest they too meet the same fate as Kodak, Nokia, and Blackberry.

Also read in this issue – an interview with Mr K K Lalpuria, Executive Director of Indo Count Industries, where he talks about opportunities for home textiles players and the growth ahead.

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Best wishes

Vineet Bhatnagar

# BLOCK BY BLOCK

SMART-CONTRACTS

# VIRTUAL ORGANISATIONS

In November 2013, a hitherto unknown word caught the fancy of the world – Bitcoin. While the first Bitcoin was 'minted' in 2009, its knowledge had remained confined to a select set of programmers. But in November 2013, the price of 'Bitcoin' quintupled in a month – catching the fancy of the who's who of the technology and financial industries. Over the next three years, Bitcoin, and its parent concept, Blockchain, became a household name among technology companies.

In the last two years, there is probably not a single financial or technology company that would not have explored Blockchain. As a concept, Blockchain promises to transform the way we trade by eliminating the two biggest inefficiencies in a transaction – time and cost. It promises to approve / execute transactions 'real-time', while reducing the role of 'thirdparty intermediaries'.

It promises to be one of the (if not THE) most disruptive technologies that the world have ever seen. If implemented with caution, taking all stakeholders along, it can truly transform the way the world transacts today – rendering scores of technologies and hundreds of business, obsolete.



# **COVER STORY**

#### G S

#### **BY VIBHOR SINGHAL & SHYAMAL DHRUVE**

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# Evolution of trade systems

The medieval and pre-medieval periods used the barter system for trade – where people exchanged goods and services for other goods and services in return, without the need for a common denomination called 'money'. Though in use for many decades, the system had its own disadvantages. First, the person who wanted to exchange any goods or services had to find another person trade with. This exercise proved highly inefficient - consuming significant time and energy. Second, there was no common measure of value for trade. To overcome this problem, the first coins were minted by king of Liyda in 600 BC, followed by paper money by China. Since then, technology evolution has brought many changes to the financial systems. The first credit card was issued in 1960s to ease the burden of carrying cash. The introduction of ATMs in 1980s, replacing tellers and branches, changed the way the financial systems operated. The emergence of internet-enabled transactions across borders and in different currencies and the invention of smart devices in early 2000s enabled 'any-place any-time' transactions.



Since all these methods are controlled by regulatory authorities and are often completed with the help of third-party intermediaries, their time and costs were high. Hence, there has always been a latent need for a technology/platform that can facilitate transactions in real-time with minimal cost. This led to the emergence of distributed ledger technology (DLT) – an enabling mechanism, which can be collaborated with the existing systems, to make transactions/ processes happen in real-time and at much lower cost.



# What is Blockchain?

Blockchain is a manifestation of 'distributed ledger' (shared ledger) technology. It is a database system supported by cryptographic verification, which can be written only once. It is bound by a series of blocks that are subsequently verified into a chain sequence of linked batches over time.

To understand how a Blockchain works, it a good idea to explore how Bitcoin (an instance of Blockchain technology) works. It would be easy to 'extend' this understanding to other Blockchain platforms.

# What is Bitcoin?

Bitcoin is a digital payment network, based on the concept of DLT, which uses Bitcoins as a currency. For people familiar with coding in C/C++, Bitcoin represents an 'object' of the 'class' Blockchain. As in the coding language, a 'class' is an abstract declaration, while 'object' is a real-life manifestation – similarly, Bitcoin is a real-life implementation

of the Blockchain/DLT technology. Also, since an abstract declaration is much more difficult to comprehend, Bitcoin, is useful to grasp the Blockchain concept.

Bitcoin was created by group of independent programmers. The term was first coined by Satoshi Nakamoto in 2008. It was released as open-source software in 2009. It is a peer-to-



peer system where transactions take place between users directly, without a third party. The first Bitcoin was 'minted' on 3rd January 2009, the first payment was made on 11th January 2009, and the software was released as open-source on 15th January 2009, enabling anyone with the required technical skills to get involved.

Bitcoin is not owned or issued by any central authority, government, or financial institution. It is an open-source distributed system without ownership. It is managed and operated by a worldwide community of developers and users.

## "<u>Real-time Bitcoin generation can be</u> <u>tracked here (https://blockchain.info/)"</u>.

#### How Bitcoins work?

The Bitcoin platform maintains a public distributed ledger, which contains all the Bitcoin transactions that have ever taken place. It works without any central authority or regulator. Its maintenance is performed by a network of communicating nodes running Bitcoin software.

Generation of new Bitcoins depends on the transaction-clearing process, called *mining*, which is the process of adding and verifying new transaction

records to Bitcoin's public ledger. People who perform this task are called *miners*. Miners collect transactions on the network into large bundles known as *blocks*. A block is generated when a user transacts using the Bitcoin. The blocks are interrelated in a chronological order, with each block containing the hash (a large number written in hexadecimal format) of the previous block. Once the transaction completes, it goes into a continuous and authoritative record.

To be able to generate non-conflicting transactions on this platform, the miners have to compute a cryptographic hash of the block that needs certain pre-defined criteria. This process is known as *hashing*.

#### How new Bitcoins are generated?

Unlike the fiat currencies that are issued by central banks of respective countries, Bitcoin does not have any central regulator that creates Bitcoins. Pending Bitcoin transactions are collected by mining computers every ten minutes and are then turned into a mathematical puzzle. The first miner to find the solution announces it to others on the network, to check whether the solution to the puzzle is correct. If majority of the miners give approval, the block is cryptographically added to the ledger. The miners then move on to the next set of pending



Source: Letstalkpayments

#### Blockchain eliminates the need of a third-party intermediary



... but machine-to-machine payment using the Bitcoin protocol could allow for direct payment between individuals, as well as support micropayments. transactions. The miner who found the solution gets predefined number of Bitcoins (BTC) as a reward (after another 99 blocks have been added to the ledger), out of the unmined pool of Bitcoins. All this gives miners an incentive to participate in the system and validate transactions.

The reward halves every four years. From 2009 till 2012, miners got 50BTC for every successful transaction which declined to 25BTC for 2013 to 2016. Currently, miners get 12.5BTC for every successful transaction.

#### Total number of Bitcoins that can be mined:

Bitcoin platform was started on 3rd January 2009 by Satoshi Nakamoto and the first transaction was recorded by paying a reward of 50 Bitcoins to its creator. Bitcoin mining process was designed in a way that for each block mined, the miner would get 50 Bitcoins, and each new block would be mined at an interval of 10 minutes from the previous block mined. So in the first four years, the total number of Bitcoins mined was ~10.5mn. The new Bitcoins mined have to be halved every four years. Hence, the total number of Bitcoins mined generated – governed by **"the sum of a geometrical progression with common ratio < 1"** – would be ~21mn. As on 26th December 2016, the total number of Bitcoins mined stood at 16.1mn, leaving 5mn unmined Bitcoins.

#### Bitcoins can be obtained:

- From Bitcoin exchanges
- From Bitcoin ATMs
- By accepting Bitcoins as payment for goods or services
- By mining Bitcoins
- By exchanging Bitcoins for cash

#### Blockchain market size:

In February 2015, the number of merchants accepting Bitcoin for products and services surpassed 100,000. Instead of the 2-3% that credit-card processors typically impose, merchants accepting Bitcoins often pay fees of 0% to less than 2%. Though Bitcoin usage at the merchant level has grown significantly recently, it has not yet gained as much traction in retail transactions. Many of the regulatory bodies (like The European Banking Authority) have warned that Bitcoin users are not protected by refund rights or charge backs.



Source: PhillipCapital India Reserch. Note: Mt. Gox, Bitstamp, Coinbase and Bitfinex are Bitcoin Exchanges

# Extending Bitcoin understanding to Blockchain

Most Blockchain platforms would operate just as the Bitcoin platform works. Digital contracts will be initiated by the transacting parties, vetted by third parties, and added to the chain of transaction via a cryptographic code.

ISG, a leading global technology research and advisory firm, has defined Blockchain as "a general purpose distributed and decentralised transaction ledger that is being investigated for all sorts of industry business processes and application uses beyond digital currency". It operates through digitally signed contracts, verified by third parties (independent/private). These third parties would encrypt the transaction using a cryptographic code and add the transaction to the ledger (yes, third parties are involved, but more on this later).

#### Market need for Blockchain

Blockchain eliminates fraudulent transaction in the network. Say a transaction is taking place between two users, A and B. Now what happens if B tries to change the transaction details? It may happen that he sends two different versions of the same transaction, at the same time, to half of his nodes each. These nodes, in turn, update their ledgers and send the transactions to a following node. In this case, half of the nodes receive one version of the transaction, which is correct, while the rest of the nodes receive other version of the transaction that is invalid. Blockchain, in effect, removes this *double-spending* (when two different transactions try to spend same Bitcoins) problem.

#### **Benefits of Blockchain:**

- Faster 24\*7 transactions: Interbank/interparty transactions generally take few days for clearing and final settlement. Using Blockchain, these can be processed 24\*7, real-time, and in minutes.
- **Lower transaction costs:** As there is no third party involved in managing transactions (dependent on the

Blockchain platform), the cost of maintaining/verifying assets is eliminated, which reduces transaction fees.

- Trust-less exchange: Parties can make their own or transact on public exchange without the need of an intermediary.
- **High-quality data:** Blockchain data is complete, consistent, timely, accurate, and widely available.
- Durability and reliability: As the Blockchain network is decentralised, it does not have a central point of failure and hence it is better equipped to withstand malicious attacks.
- **Trail of transactions:** All transactions are recorded on the Blockchain, which cannot be altered or deleted. Hence, a user can get the trail of any transaction anytime.
- **Transparency and immutability:** Changes to public Blockchains are publicly viewable by all parties, creating transparency, and none of the transactions, once recorded, can be altered or deleted.

#### Mining / Vetting – the immediate challenge

The primary benefit of DLT, as listed above (and will be demonstrated with use-cases later), is real-time processing of transactions and eliminating the need for a central regulatory body. While DLT in its current form theoretically achieves the first (real-time processing), it only substitutes the second with a decentralised vetting authority – miners.

Most existing DLT platforms require miners or independent third parties to write a cryptographic code that contains the detail of the transaction, parties, and the address of the previous transaction. Given that DLT platforms haven't gained much popularity or adoption yet, it is easy to find enough 'miners' who can write this cryptographic code to ensure real-time execution of the transaction. But as this platforms gain popularity, and more people/enterprises start adopting it, the existence and availability of enough gualified 'miners' could become a serious bottleneck for the adoption of this technology. Though it is early days in the adoption lifecycle of DLT, the availability of miners is a critical issue that needs to be addressed. Else, DLT will lose both its advantages - absence of central regulator (as the regulator will be substituted by third-party 'vettors') and real-time processing (as low availability of third-party vettors will delay transaction execution).

# **Blockchain Platforms**

#### **Public Blockchain**

In a public Blockchain, anyone in the world can read, send transactions and expect to see them included if they are valid, and participate in the consensus process – the process for determining what blocks get added to the chain and what the current state is. Public Blockchains are secured by "crypto economics" – the combination of economic incentives and cryptographic verification using mechanisms such as proof of work or proof of stake. These Blockchains are generally considered 'fully decentralised'. Well known public Blockchain platforms include: Bitcoins, Ripple, and Ethereum.

#### Bitcoins: as explained in the earlier section

**Ripple:** Developed by Ripple Labs (earlier OpenCoin), it is a digital currency as well as an open-source payment network. Ripple is actually older than Bitcoin. It was first implemented in 2004 as a payment network and distributed exchange. The currency was not launched until February 2013 by OpenCoin. An alternative to RTGS, Ripple helps banks and financial institutions across the globe to send and/or receive payments in real-time across the network. Its currency is called XRP (ripples).

Ripple is similar to Bitcoins in a way that both are digital currencies, generated based on mathematical formulas, with a limited number of units that can be mined. Both are a

peer-to-peer network, without needing any regulatory authority. However, the key difference between them is that Bitcoin requires mining to complete the transaction while Ripple does not. The creators of Ripple created 100bn ripples (XRP) at the start. Out of these 100bn XRP, 20bn were retained by the creators, seeders, venture capital companies, and other founders. The remaining 80bn were gifted to Ripple Labs, who will distribute 55bn of the 80bn to charitable organisations, users, and strategic partners. Ripple Labs will retain the remaining 25bn XRP.

Though Ripple is designed to operate



without a central authority or regulatory, currently, most of its validating servers are either operated or managed by Ripple Labs. So it's not a fully distributed ledger yet.

Through two of its licensing solutions – Cross-Currency Settlement and FX Market Making – it helps banks and financial institutions with real-time settlement for international payments. Munich-based Fidor Bank AG was the first bank to integrate the Ripple protocol to provide faster and affordable money transfer services to its customers. Other banks using the Ripple protocol are Cross River Bank, CBW Bank etc.

**Ethereum:** Unlike Bitcoins, where operations are predefined, Ethereum lets users create their own operations of any complexities. It was launched in 2015. It is an opensource decentralised software platform enabling smart contracts and Distributed Applications, which are built and run without third-party interference.

Ethereum is developed as a platform to facilitate peer-topeer contracts and applications via its own currency.

#### Private Blockchain

In a fully private Blockchain, 'write' permissions are kept centralised – to one organisation. 'Read' permissions may be public or restricted. Likely applications include database management and auditing (internal) for a single company.

**Hyperledger:** It is an open-source collaborative platform developed by Linux systems in December 2015. Unlike Bitcoins and Ripple, which are working on a public

decentralised platform, Hyperledger is a private distributed ledger. This platform supports functions like financial transactions, supply chain, IoT, and manufacturing.

**Corda:** Corda is a distributed ledger platform developed by financial firm R3. Though inspired by Bitcoin's opensource platform, it shares its data only with certain entities on a 'need-toknow' basis. In a Bitcoin network, all transactions are visible to the entire community while in Corda, transactions are validated by specific parties to that transaction. Corda can also coordinate the workflow between firms without the need for a central controller.

# The transformative capability of Blockchain

In August 2016, World Economic Forum, in collaboration with Deloitte, came out with a white paper on "The Future of Financial Infrastructure – How Blockchain can reshape Financial Services." The study was done to showcase how DLT technology will shape the financial services ecosystem, and its implications on the future of the financial services. Its key findings were:

- Blockchain has great potential to drive simplicity and efficiency through the establishment of new financial services infrastructure and processes
- Blockchain is not a panacea; instead it should be viewed as one of many technologies that will form the foundation of the next generation of financial services infrastructure
- Applications of Blockchain will differ by 'use case', each leveraging the technology in different ways for a diverse range of benefits
- Digital Identity is a critical enabler to broaden applications to new verticals; Digital Fiat (legal tender), along with other emerging capabilities, has the ability to amplify benefits
- The most impactful Blockchain applications will require deep collaboration between incumbents, innovators and regulators, which might also lead to higher complexity and delayed implementation
- New financial services infrastructure built on BlockChain will redraw processes and call into question orthodoxies that are foundational to today's business models.

Blockchain is one of the most talked about technologies in the financial services industry today.

"Blockchain has the potential to address these limitations of the current processes by modernising and simplifying the traditional 'siloed' design of the financial industry infrastructure with a shared fabric of common information" says WEF.

It is named a leader in Gartner's Hype Cycle for Emerging Technologies. The shift from a centralised technical infrastructure to distributed, ecosystemenabling platforms is laying the foundations for new business models in payments, digital banking, and financial transaction technologies.

Financial services industry is far ahead in terms of experimenting with newer technologies. Blockchain, with its characteristics of sharing a system of records through consensus and trust, will help financial services firms to transfer assets within their business networks. Blockchain can be disruptive in the sense that – it will replace the traditional ledger system with distributed ledgers, which will lead to newer business models replacing existing hub-and-spoke model with intermediaries.

In banking, key transactions (in processes) revolve around asset ownership. Several layers of data are exchanged between financial institutions through intermediaries in order to complete any transaction. The processes, many a times, become inefficient and expensive. Blockchain, through its distributed ledger technology, promises to resolve all that. The banking industry is faced with a number of changing demands. International payments are increasing at twice the global GDP growth. In a report in July 2016, consulting firm Accenture PLC estimated that banks process US\$ 25-30tn of cross-border payments annually, across 10-15 billion transactions. Financial institutions must have proper infrastructure in place to support ever-increasing transactions. However, due to the limitations in today's infrastructure, banks process payments in batches, resulting in high processing costs, lengthy settlement times, and a poor customer experience. The use of DLT can solve this problem as it will replace third-party intermediaries, resulting in real-time transactions at less time and cost.



BLUE: Current / Future Process; RED: Pain points; GREEN: Future benefits Source: World Economic Forum, PhillipCapital India Research

# P&C Insurance

P&C is the second-largest segment of insurance and is expected to generate premiums of US\$ 895bn by 2018 (as per a Finaccord 2015 report). However, claim settlement is a major pain point -- it costs 11% of annual premiums for P&C insurers. The key growth driver in the market would be the change in customer demographics and economic recovery. The current insurance claims process requires manual collection of data, which is time consuming and also prone to frauds. With the use of DLT, an insurer can obtain the required claim documents, along with the history of the insuree in real-time, hence reducing the claim processing time and also the cost.



BLUE: Current / Future Process; RED: Pain points; GREEN: Future benefits

# Syndicate loans

A syndicated loan is one that is provided by a group of lenders and is structured, arranged, and administered by one or several commercial or investment banks known as arrangers. Factors such as a large amount to protect capital adequacy ratios, or to diversify risk arising from a single borrower, form the basis of lenders opting for syndicate loans. The US loan market is estimated to be of US\$ 1.92tn (as of 2014), with four of the largest financial institutes in the US accounting for more than 50% market share. The process of identifying members for the syndicate is time consuming, and often results in delays in loan approvals. With the use of DLT, the lead arranger can decide for the syndicate members in real-time by using smart contracts.



**BLUE:** Current / Future Process; **RED:** Pain points; **GREEN:** Future benefits Source: World Economic Forum, PhillipCapital India Research

# Trade Finance

Trade financing helps businesses fund goods or services. It includes lending, issuing letter of credit, export credit, and insurance. Financing has become an integral part of trading with an annual market-size of US\$ 10tn (as per World Trade Organization 2015 report).



Trade finance: Future process and benefits



BLUE: Current / Future Process; RED: Pain points; GREEN: Future benefits Source: World Economic Forum, PhillipCapital India Research

# Compliance

With the increasing use of cross-border and multi-currency transactions, banks find themselves at a centre of all the government regulations regarding certain requirements, restrictions, and guidelines. As per a Financial Times 2015 report, large financial institutions have spent US\$ 4bn in compliance related activities in 2014.



Automated compliance: Future process and benefits



# Capital Markets

There are many intermediaries involved in a trade – exchanges, depositories, brokers, custodians, and investment managers. These intermediaries have to update their ledgers in real-time to complete transactions without any error. However, due to the involvement of many parties, the process faces delays, increasing costs.

Blockchain will benefit capital market services at all stages of trade and securities servicing.

**Pre-trade:** Blockchain, through smart contracts, stores and facilitates KYC data, reducing cost and eliminating the number of KYC checks. It will also help in the transparency and verification of holdings, leading to reduced credit exposures.

**Trade:** Blockchain ensures a secure, real-time transaction matching, and immediate irrevocable settlement; it also helps in more transparent supervision for market authorities, establishing higher anti-money laundering standards.



Blockchain applicability in Capital Markets

**Post-trade:** As there are no intermediaries involved in

the transactions, it results in reduced margin or collateral requirements, resulting in faster and efficient post-trade processing.

**Custody & Securities Servicing:** Securities are directly issued onto a Blockchain, through smart contracts, to the parties. Fund subscriptions and redemptions are processed

automatically making it simple for accounting, allocations, and administration.

#### Pre-IPO share allotment: NASDAQ, in Oct 2015,

announced that it has issued its first investor shares on the platform Linq, a Blockchain-based service, to issue pre-IPO shares of companies.

or regular data sources

# Supply Chain

Everledger, a London-based start-up specialising in tracking and protecting valuable assets throughout their lifetime journey, has developed a Blockchain platform that helps companies track the origin of diamonds, allowing buyers to screen for stones mined in those regions where forced labor is common or where proceeds from previous sales were used to fund violence. Everledger is also building systems to record the movement of diamonds from mines to jewelry stores and has been using various blockchain tools, including Bitcoin's ledger. Everledger is testing IBM Blockchain for a global rollout possibly by the end of the year.

The IBM business unit deals with 4,000 suppliers, financing customers and partners who conduct about three million transactions per year, worth US\$ 44bn. As per estimates, about 25,000 disputes on an average arise annually over various issues like wrong number of computer parts in an order or delay in deliveries. These would take an average of

44 days to resolve. Also, there were 6-7 different software applications to verify steps taken in the arrangement as well as having to call banks, financial institutions, and associated partners. IBM, with the use of DLT, recorded transactions faster and accurately than its traditional resources, resulting in issues resolving in 10 days.



# Healthcare

Today's healthcare processes depends on reconciling medical data among clinics, hospitals, labs, pharmacies, and insurance companies manually. The shortcoming of this process is that there is no single list of all the places data can be found or the order in which it was entered. Also, though data standards are better now compared to the earlier times, each electronic health record (EHR) stores data using different workflows.

To overcome this, MIT researchers Ariel Ekblaw, Asaf Azaria and Thiago Vieira are developing a cryptocurrency-backed technology MedRec. MedRec doesn't store health records. It links patient's medical records across the different doctor's databases. It stores the digital signature of the records on the Blockchain. The benefit of the signature is that an unaltered copy of the record is obtained by the concerned entities. The miners for MedRec are medical researchers who are rewarded with access to census-level data of the medical records. Similar to the census, the individual privacy of the person is protected, and the aggregate data is used for critical research.

By using the blockchain in healthcare system, it avoids adding another organisation between the patient and the records. It also adds due consideration to a time-stamped, programmable ledger.

# Progress of Blockchain as a concept

After seeing the HUGE transformative capability of the Blockchain platforms, the next big questions that need to be answered are:

- 1) In what stage of its adoption cycle is Blockchain?
- 2) What is the kind of interest from potential clients?
- 3) What kind of pilot projects / POCs / live implementations have been carried out?

To answer the first question, GV took the help of a leading consultant in the technology space - Information Services Group (ISG), who made an exclusive contribution to this report.

# <u>Current state of Blockchain technology adoption</u> (exclusive contribution by ISG)

Blockchain is in the middle of its market discovery period involving experimental participants including researchers, programmers, business movers and shakers, venture capital investors, IT service and technology providers and buyers of software and services concentrated in the financial services industries. Not quite into early adoption, we expect 2017 will be another year of "hype" focused on Blockchain's blue-sky possibilities and elusive practical realities.

We are forecasting the use and adoption of Blockchain applications in the enterprise will follow the traditional decade-long cycle typical of most new technologies where



early-market experimentalists discover its possibilities, and practical applications follow. We anticipate the coming 12 to 24 months will see early experimentalists move from investigation projects into their first production trials, the stage where business processes meet technology proof of concept trials.

This will be followed by the first early mainstream production uses of second generation technology by early market movers in the financial and adjacent industries and markets closest to the experimentalists over a three- to five- year period.

> Lastly, we expect Blockchain will see later mainstream adoption using a third generation of the technology as it breaks out of its seed industry and adjacent sectors from which it starts, and that this commences about half-way through the cycle and takes another five years to reach wider market use.

#### **Overcoming Blockchain's Use Case Chasms**

Blockchain solves a unique issue, it prevents double-spending of Bitcoin. Once spent, it prevents the same Bitcoin from being spent again. It also creates consensus about the order of entries in its distributed ownership ledger. The capabilities that will find their way into future uses of Blockchain include:

- Different distributed ledgers that deliver value because the information in them is shared
- Different self-contained consensus processes that deliver value (i.e., smart contracts)

Outside of its Bitcoin beginnings – which solves preventing the double-spend of a coin or exchanged token of value – the potential use cases are even more interesting. However, to satisfy these interesting use cases, **its current ownership ledger and consensus miner system must evolve if its market uses are to break into use cases beyond the ownership and double-spend problem Bitcoin Blockchain solves.** 

Until the arrival of these alternatives, Blockchain's progress into other ecosystems and markets (Strategic Market Decisions and Blockchain's Uber-Ecosystems) could be delayed (as discussed in our Aug 2016 report).

#### Early Mainstream and Adjacent Markets

As with all forecasts, the closer to the action, the better the vision. As we look out toward the medium-term between 2018 and 2021, we see some notable business use cases close to the financial services industry that are likely to see trials and uses that include:

- Insurance claims processing systems
- Derivatives trading systems
- Trade authorisation systems

Additional uses during this period, beyond Bitcoin's Blockchain methods, could include applications in investment banking, digital identity, smart authorisations, and at-armslength transparent regulatory attestations / audits among others.

#### Late Mainstream and Breakout

Longer-term forecasts are as good as putting one's finger in the air to determine which direction the wind is blowing today: although you do not know exactly what direction the wind will be tomorrow, it will be one of four and their variations. Instead of adding fuel to the "Blockchain disrupts the world" fire, the longer-term view for Blockchain is more about possibilities than likelihood. Most of these uses will include expansion into industry uses outside of the financial services industry. Some of these uses might include: automotive servicing and sales, shared patient medical records in healthcare, virtual online retail and wholesale distribution markets, and event ticketing systems in the entertainment industry.

Other uses might include machine-to-machine applications servicing edge-of-network IoT sensor uses, legal services, life-science market testing, and new markets for asset rentals and trading, longer-term property records, law enforcement uses, and utility energy trading.

#### **Decisions About Blockchain's Future**

Blockchain's future is going to follow the traditional decadeplus adoption arc of most new technologies. Along the way, the path will be bumpy and smooth, depending on the path one is on, the addressable use cases of the underlying technologies, and the environmental conditions impacting the journey.

- IT leaders: The key decision for IT leaders will be determining where along the spectrum of Blockchains path the enterprise needs to be: experimentalist, early mainstream, later mainstream, and for which business purposes and why. These decisions will be followed by when to jump onto the path, and which path to take.
- **IT providers:** The key decision for IT vendors will be determining when to jump aboard the Blockchain train, for what destination, and which tracks and schedules to choose.

#### Exclusive contribution by Jim Hurley, ISG Research

Mr. Hurley provides clients with research based insight into the future of business IT for strategic and tactical growth and profit. His research focuses on practical uses of changing and emerging technology for business including the uses of data science, cognitive computing, cybersecurity and compliance, Blockchain, digital intelligence and digital labor enabled business processes.

Mr. Hurley is a graduate of Boston University with a BFA and has graduate training in computer science, engineering, physics and mathematics. He is a co-inventor of numerous software and business improvement process systems used in many different industries, as well as the co-inventor of MRI systems used in the healthcare industry and magnetic confinement systems used in the energy industry.

# Interest from potential clients

A recent paper published by Infosys (a leading Indian IT services company) helped GV find the answer to the second question, which is – **'What is the kind of interest from potential clients?'**.

Infosys has been making significant inroads in the Blockchain space, having implemented pilot projects for India's largest private sector bank, ICICI Bank, and the leading banking group in the Middle East, Emirates NBD. With an aim to gauge the interest level in this new technology, Infosys Finacle and Let's Talk Payments (LTP) partnered to explore the next phase in the adoption of this technology through a survey among key decision makers in financial institutions. The survey respondents included more than 100 business and technology leaders from over 75 financial institutions, ranging from small regional banks to multinational banks.

Key findings of the survey were:

- 50% of banks surveyed have already invested in Blockchain or will do so in 2017
- Average investment in Blockchain projects in 2017 is expected to be about US\$ 1mn per institution
- 33% of respondents expect to see commercial Blockchain adoption by 2018, while 50% expect to see it by 2020
- Majority of banks surveyed, about 69%, are experimenting with permissioned Blockchains, while 21% plan to use hybrid variants
- Cross-border payments, digital identity management, clearing and settlement, letter of credit process, and syndication of loans, are the top-5 use cases chosen by the respondents as the most likely for commercial adoption
- About half of the banks surveyed were working with a FinTech start-up or a technology company to augment their Blockchain capabilities; another 30% had opted for the consortium model
- 74% of banks surveyed stated that executives driving Blockchain initiatives in their organisations were either Chief Technology

Officers, Chief Innovation Officers, or Line of Business Heads

- Top Challenges
  - □ Lack of co-operation between banks/FIs
  - □ Lack of understanding of the technology
  - Delay in decision-making
  - Technology limitations
- Top Opportunities
  - □ Improved transparency
  - □ Reduction in settlement and transaction time



#### Who drives blockchain investments in financial institutions?



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# POCs/Projects being implemented

To answer the third question – **' What kind of pilot projects / POCs / live implementations have been carried out?'**, GV engaged with various stakeholders – enterprises, vendors, and consultants, especially in the BFSI industry. Research and interactions led to the following details about the stages of Blockchain adoption by large global enterprises:

#### Live implementation

Australian Securities Exchange: In January 2016, the Australian Securities Exchange (ASX) announced developing a private Blockchain platform for post-trade solutions, in collaboration with US-based Digital Asset Holdings. This platform would replace the existing legacy platform of Clearing House Electronic Subregister System (CHESS), which the exchange is using for many years.

**NASDAQ:** It became the first financial institution to take the Blockchain PoC live when it launched Linq, a private share-trading platform (2015) that enabled private companies to digitally represent share ownership using BBlockchain-based technology.

**Fidor Bank:** The bank has partnered with Kraken to provide a digital currency exchange in the EU, and with Bitcoin.de, a P2P BTC trading platform in Germany.

**CBW Bank, Cross River Bank:** Partnered with Ripple Labs to build a risk-management system and provide lower-cost remittance services.

corporate recognition program; these can be redeemed for gifts and other rewards.

**ICICI Bank:** In October 2016 the bank, announced that its partnership with Emirates NBD had successfully executed transactions in international trade finance and remittances using Blockchain technology. It became the first bank in India to exchange and authenticate remittance transaction messages as well as original international trade documents related to purchase order, invoice, shipping, and insurance electronically on Blockchain in real time. The transaction was done on Blockchain application created by EdgeVerve Systems (100% subsidiary of Infosys).

**Barclays:** through an Israel-based start-up, carried out the world's first trade transaction using Blockchain technology, cutting a process that normally takes 7-10 days to less than 4 hours. The transaction guaranteed export of US\$ 100,000 worth of cheese and butter from Irish agricultural food co-operative Ornua (formerly the Irish Dairy Board) to the Seychelles Trading Company. The deal was executed via a Blockchain platform set up by Wave, a firm that came through Barclays development program.



BNY Mellon: Created own currency called "BK Coins" as a

#### **Experimental stage**

**US Federal Reserve:** Federal Reserve is reportedly working with IBM on developing a new digital payment system tied to Blockchain. (Mar 2015)

**LHV Bank:** tarted working on Blockchain technology in June 2014. They developed an app based on collared coins called Cuber Wallet in June 2015.

**Rabobank, ABN Amro, ING Bank:** Exploring Blockchain for various banking services. Rabobank has also partnered with Ripple Labs.

**Santander:** Claims to have 20-25 use cases for Blockchain and has a team called "Crypto 2.0" to research the use of Blockchain in banking.

**Westpac:** Westpac had partnered with Ripple to develop a low-cost, cross-border payments platform. Reinventure, its VC arm, participated in Coinbase's US\$ 75mn funding.

**UBS:** Has a crypto currency lab in London and is experimenting in payments, trading and settlement, and smart bonds. It has also stated that they have 20-25 use cases of Blockchain for finance.

**Barclays Bank:** The bank has two Bitcoin labs in London that are open for various Bitcoin and Blockchain entrepreneurs, coders, and businesses. Barclays also claims to have 45 experiments they want to do internally.

**CBA:** Has partnered with Ripple Labs to implement Blockchain ledger system for payment settlements between its subsidiaries.

**Citibank:** It has set up three separate systems within Citi that deploy Blockchain-based distributed technologies. It developed an equivalent to Bitcoin called "Citicoin," which is being used internally to understand the digital currency trading system better.

Bank of America, Merrill Lynch, HSBC, and the Infocomm Development Authority of Singapore have claimed success in demonstrating the application of distributed ledgers to replace paper-based Letters of Credit in trade finance transactions. The application enables exporters, importers and their respective banks to share information on a private distributed ledger. The application uses the open source Hyperledger as Blockchain fabric.

#### Theoretical stage

**Deutsche Bank:** The bank has been exploring various use cases of Blockchain in areas of payments and settlement of fiat currencies, asset registries, enforcement and clearing derivative contracts, regulatory reporting, KYC, AML registries, and improving post-trade processing services. It has been experimenting with these technologies at its innovation labs in London, Berlin, and Silicon Valley.

**DBS Bank:** The bank organised a Blockchain hackathon in Singapore in partnership with Coin Republic, a Singaporebased Bitcoin company & Startupbootcamp FinTech. (May 2015).

BitX, Blockstrap, and Colu provided APIs for the two-day hackathon series. The winners were Omnichain (first place, an investment platform for emerging markets), Nubank (second place, provides banking for the unbanked) and BlockIntel (third place, a transaction security platform).

**EBA:** Euro Banking Association (EBA) has released a report (in May 2015) talking about the implications of cryptotechnologies from the perspective of transaction banking and payment professionals, in the next 1-3 years. It has noted that these technologies could be leveraged by banks to reduce governance and audit costs, to provide better products and faster time to market.

**Goldman Sachs:** Goldman Sachs participated as a lead investor in Bitcoin startup Circle Internet Financial Ltd.'s US\$ 50mn funding round. It has also reported extensively on Bitcoin and Blockchain in its annual publication Future of Finance.

**BBVA Ventures:** Investor in Coinbase. Has also released a research report stating its interest in Blockchain technology.

**USAA Bank:** Created a research team to study uses of Bitcoin.

**ANZ Bank:** Partnered with Ripple to explore potential use cases of Blockchain.

**Societe Generale:** Planning to staff employees with BTC, Blockchain and cryptocurrency expertise.



Source: Letstalkpayments



Source: Letstalkpayments



Source: Letstalkpayments



# Challenges of implementing Blockchain

The adoption of Blockchain, as discussed above, is currently in the early-adopters phase – yet to cross the 'chasm'. Like all disruptive technologies do, Blockchain will also face a lot of resistance from people who love 'status quo' and are reluctant to change (and the share of these kinds of people is generally very high). However, even for those willing to take the plunge and test the waters, Blockchain adoption is not free of challenges; the proponents of this technology will have to address these to facilitate its smooth and quick adoption.

- Emerging technology: The Blockchain technology is currently at a nascent stage. Hence, it will require time and awareness to spread-out benefits of using this technology. The kind of transactions that can be made using Blockchain, omnipresence of digital contracts, absence of adequate number of third-parties to verify/ encode/add the transaction to the ledger – are all areas that are gradually evolving.
- Uncertainty over regulatory frameworks: World over, fiat currencies are printed and regulated by central banks of respective countries. Transactions in other domains (insurance etc.) are all regulated by their respective regulators. There is virtually no role of a regulator in a Blockchain platform – something that even transacting parties are yet to become comfortable with. Also, being virtual in nature (Bitcoin or other platforms), the current regulators have no jurisdiction over Blockchain.
- Large energy consumption: The Blockchain network requires 'mining' in order to verify/encode/add the transaction to the ledger. This continuous mining consumes substantial amount of energy, which leads to increase in energy cost.
- Integration issues
- **Cost:** Though the Blockchain network is said to be a cost-effective way for transaction (as there are no intermediaries), the initial cost of setting up requires significant capital investments.

# The primary challenge -Regulatory

The biggest challenge for Blockchain platform will be how to handle regulators. Blockchain's biggest impact is expected to be on the BFSI sector – where it promises to eliminate both time and costs related to various types of transactions. But regulators play a very active role in this segment – the sole body responsible for any dispute resolution. Since Blockchain platforms, in effect, remove these dispute resolvers, clients will always be confused about whom to turn to in case of a dispute in any transaction. Reassurances, such as presence of smart contracts and decentralised cryptographically coded ledger that ensure no disputes occur – provide little solace. Customers would always want an answer to 'what if'. Also, current financial regulators across the world are keeping a close eye on the fast adoption of Blockchain technology by various participants in the industry.

#### **Regulatory status of Bitcoin**

Legal	Not a currency, hence not regulated	lllegal	No official statement
Australia	Denmark	China	Greece
Canada	India	Russia	Hong Kong
EU	Indonesia	Thailand	Malaysia
Finland	Ireland	New Zealand	Argentina
Germany	Netherlands		
Japan	Philippines		
Sweden	Poland		
Switzerland	Portugal		
France	Singapore		
Romania	South Africa		
Spain	UK		
US			
South Korea			

Source: PhillipCapital India Research

#### Key quotes from major countries

**Australia:** "There would be nothing to stop people in this country deciding to transact in some other currency in a shop if they wanted to. There's no law against that, so we do have competing currencies." (Dec 2013)

**European Union:** "The exchange of traditional currencies for units of the 'Bitcoin' virtual currency is exempt from VAT. Member States must exempt, inter alia, transactions relating to 'currency, bank notes and coins used as legal tender'". (Oct 2015)

**G7:** "Internet-based payment services that allow third party funding from anonymous sources may face an

increased risk of [money laundering/terrorist financing]." (2013)

**New Zealand:** "Non-banks do not need our approval for schemes that involve the storage and/or transfer of value (such as 'Bitcoin') – so long as they do not involve the issuance of physical circulating currency (notes and coins)."

**Singapore:** "[w]hether or not businesses accept Bitcoins in exchange for their goods and services is a commercial decision in which MAS does not intervene." (Dec 2013)

**United States:** "Bitcoins are funds within the plain meaning of that term". (Sep 2016)

#### US SEC ruling on bitcoin-based ETF:

On 10th March 2017, Securities and Exchange Commission (SEC) in its ruling for Winklevoss ETF has rejected the proposal of bitcoin-based ETF, citing lack of regulation. Proposed in 2013, by Winklevoss brothers Cameron and Tyler, the Winklevoss Bitcoin Trust was the first Bitcoin ETF (here) to be filed with the SEC.

"As discussed further below, the Commission is disapproving this proposed rule change because it does not" .... comply with .... "the rules of a national securities exchange be designed to prevent fraudulent and manipulative acts and practices and to protect investors and the public interest."

"The Commission believes that, in order to meet this standard, an exchange that lists and trades shares of commodity-trust exchange-traded products ("ETPs") must, ..... satisfy two requirements. First, the exchange must have surveillance-sharing agreements with significant markets for trading the underlying commodity or derivatives on that commodity. And second, those markets must be regulated. – the SEC"

#### Conclusion

There is little doubt that Blockchain promises to be one of the (if not THE) most disruptive technologies that the world has ever seen. If implemented with caution, taking all stakeholders along, it can truly transform the way the world transacts today – rendering scores of technologies and hundreds of business obsolete. It is no longer a question of whether the world will adopt it, but when and in what format.

However, the technology is still in nascent stage, and has to face many winters before it settles into an eternal summer. While the possibilities with Blockchain are immense, the challenges are manifold too. Like all disruptive technologies, Blockchain will also face a lot of resistance from people who love 'status quo' and are reluctant to change. The proponents of Blockchain need to ensure that, to begin with, they do not project Blockchain as a panacea. In its initial and even much later stages, Blockchain will co-exist with current platforms and processes. Hence, the implementation of Blockchain has to be in an 'AND' format, rather than an 'OR'.

The stage is set for its performance. Only time will tell whether Blockchain is a productive rain cloud or just a hyper-inflated balloon that bursts soon after the audience's first clap. The next two years should provide a clear direction.

# **K K LALPURIA** Executive Director - Indo Count Industries

#### **BY VIKRAM SURYAVANSHI**

India has performed very well in home textiles, leveraging its advantages in terms of cotton and labour costs. Within this sector, Indo Count has transformed itself into a leading player in bed linen and has emerged as the third-largest cotton bed linen supplier to the USA.

In conversation with Ground View, Mr K K Lalpuria, ED - Indo Count, talks about journey so far and the road ahead. The company is promoted by Mr Anil Kumar Jain and supported by Managing Director, Mr Mohit Jain. It was a cotton-spinning company in 1991 and set up its home textiles facility in 2007-08 focusing on export of bed linen. It went through a difficult phase during the global financial crisis and the company entered CDR because of derivative losses, but it worked its way through the pain by increasing its product visibility and reputation. It successfully exited CDR in March 2015, four years ahead of schedule and is currently the 11th largest home textile supplier and third-largest bed sheets supplier to the USA.

#### What are the opportunities for Indian textile players, and r how do you view India's competitive positioning?

The textile sector has been India's forte since centuries. We have an evolved and well-established textile value chain. which makes it easier for us to expand and scale up as well as customise products. India is in a sweet spot as various factors are working to her advantage. Firstly, for any manufacturing business, raw material availability is critical. We are blessed in that regard as India is the biggest exporter of cotton. We have abundance of good quality cotton which mitigates risks associated with availability as well as the logistics of importing the commodity. Secondly, textiles need abundant and skilled workforce. India is in a favourable position in both these aspects. As exporters, in our democracy, political stability benefits us immensely as stability of policies, strong law and order, and conducive business environment help us increase our market share globally. Comparatively, within textiles, home textiles industry is a young industry. We believe there are a lot of opportunities and untapped markets awaiting the Indian players. Domestically, with rising per-capita income and improving lifestyle, the Indian consumer too is evolving.

#### What are the key challenges faced by this sector?

Indian home textiles is a major exporter and forex generator. Since Indo Count is completely export-oriented, macro global factors (weather, social, economic, and political) affect our business and the sector. New technology needs to be introduced continuously to upgrade products as well as new techniques to serve the customers. Our sector does face certain challenges such as raw material, global trade pacts, and currency fluctuations, given the global nature of our business. Raw material - cotton being an agro-based global commodity fluctuates in price due to demand-supply, which results in price volatility, and at times, availability constraints. Global trade pacts: Various trade pacts between different countries throw up new dimensions to world trade. In some countries, protectionism through tariffs compels us to find different ways to promotion. In Europe both Pakistan and Bangladesh have duty advantage, which India does not have. We pay 9.6% additional duty charges while both those countries do not. Therefore, we face headwinds in these markets and become non-competitive in comparison to these nations. Currency fluctuation: Fluctuation in currency needs efficient management and requires us to constantly monitor the dynamic situation in this field.

#### Which is the biggest threat facing the sector at the

#### moment?

The competitiveness of Indian textiles is hampered by rising operational costs and poor infrastructure support. Growth in exports requires huge investments, and if tax benefits are provided, we can reinvest our profits both for growth and competitiveness. This will result in expansion of our exports base, which would in turn earn valuable forex for the country.

# How big are the EU and other markets for home textile and challenges?

The EU is one of the biggest markets for home textiles, but given its fragmented nature, it is a difficult one. As the EU is made up of many countries, each with its own cultural preferences as well as varied consumer tastes and size specifications, this market has been challenging in comparison to the biggest 'single country' market – USA. Nevertheless, growing interest and awareness amongst consumers for cotton home textiles as well as increased traction in the mid-high segment of bed home textiles has made EU an exciting and promising market for us.

#### What is outlook on cotton prices?

Cotton is a global commodity with price volatility being a global phenomenon. We believe there is more than sufficient supply of cotton in India. India's position as the world's biggest cotton producer is hugely advantageous for the Indian textiles industry. We do not see any cause for concern over raw material supply in India. Although India is the biggest producer of cotton with a comfortable 'stock-toend-use' ratio, the average yield in India has yet not reached optimum levels. At ~521kg/hectare (yield in India) the country has immense scope for improvement in comparison to average global cotton yields at ~735kg/hectare. The recent spike in cotton prices in India can be attributed to local factors such as impact of demonetisation. Globally, we believe cotton prices would remain stable and range bound with an increase of 2-3% for the year.

#### How do you see sustainability of growth for Indian players in view of increased capacities and entry of newer players?

The bed-linen segment of home textiles is in a nascent stage. India is poised to achieve quantum growth in this sector on various advantages such as raw material availability, skilled and cost-effective labour, and well-established textile value chain, as compared to other countries. We believe there is a huge market out there yet untapped by Indian players. The pie is big enough for all players to grow at a good rate.

# Indian Economy – Trend Indicators

WORth		лоп		iicato	15									
Growth Rates (%)	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17
IIP	-1.5	2.0	0.3	-1.3	1.1	2.0	-2.5	-0.7	0.7	-1.8	5.7	-0.1	2.7	
PMI	51.1	51.1	52.4	50.5	50.7	51.7	51.8	52.6	52.1	54.4	52.3	49.6	50.4	50.7
Core sector	2.9	5.7	6.4	8.5	2.8	5.2	3.0	3.2	5.0	6.6	4.9	5.6	3.4	
WPI	-0.9	-1.0	-0.9	0.3	0.8	1.6	3.5	3.9	3.8	3.8	3.2	3.4	5.2	6.5
CPI	3.9	4.4	4.8	5.5	5.8	5.8	6.1	5.0	4.4	4.2	3.6	3.4	3.2	3.7
Money Supply	11.1	11.3	10.3	10.0	10.1	10.4	10.4	10.3	12.1	10.9	8.5	6.2	6.4	6.5
Deposit	11.1	11.0	9.9	9.3	9.5	9.7	9.5	9.2	11.3	9.8	15.3	14.5	13.2	12.1
Credit	11.4	11.6	11.3	9.2	9.8	9.4	9.7	9.6	11.2	8.5	4.7	4.7	4.62	4.36
Exports	-13.6	-5.7	-5.5	-6.7	-0.8	1.3	-6.8	-0.3	4.6	9.6	2.3	5.7	4.3	
Imports	-11.0	-5.0	-21.6	-23.1	-13.2	-7.3	-19.0	-14.1	-2.5	8.1	10.4	0.5	10.7	
Trade deficit (USD Bn)	-7.6	-6.5	-5.1	-4.8	-6.3	-8.1	-7.8	-7.7	-8.3	-10.2	-13.0	-10.4	-9.8	
Net FDI (USD Bn)	4.1	2.8	1.4	2.0	1.5	3.3	3.6	4.4	4.6	2.4	2	3	3	
FII (USD Bn)	-1.5	-2.4	4.3	1.1	-0.4	-0.2	2.7	1.0	3.0	-1.8	-3.8	-4.0	-0.4	
ECB <sup>(USD Bn)</sup>	1.4	1.4	1.5	0.3	1.3	1.1	1.2	3.2	1.6	1.5	0.3	2.5	1.8	
Dollar-Rupee	67.8	68.4	66.2	66.3	67.3	67.5	67.0	67.0	66.6	66.8	68.4	67.9	67.9	66.7
FOREX Reserves (USD Bn)	349.2	346.8	355.6	361.6	360.2	360.8	365.5	366.8	372.0	367.2	365.3	360.3	361.6	362.8

#### Monthly Economic Indicators

#### Quarterly Economic Indicators

Balance of Payment (USD Bn)	Q2FY15	Q3FY15	Q4FY15	Q1FY16	Q2FY16	Q3FY16	Q4FY16	Q1FY17	Q2FY17
Exports	85.3	79.0	70.8	68.0	67.6	64.9	65.8	66.6	67.4
Imports	123.9	118.3	102.5	102.2	104.7	98.9	90.6	90.4	93.1
Trade deficit	-38.6	-39.3	-31.7	-34.2	-37.2	-34.0	-24.8	-23.8	-25.6
Net Invisibles	28.5	30.9	30.2	28.0	28.6	26.9	24.4	23.5	22.2
CAD	-10.1	-8.4	-1.5	-6.1	-8.6	-7.1	-0.3	-0.3	-3.4
CAD (% of GDP)	2.0	1.7	0.3	1.2	1.7	1.3	0.1	0.0	0.0
Capital Account	16.5	23.6	30.7	18.6	8.1	10.9	3.5	7.1	12.7
ВоР	6.9	13.2	30.1	11.4	-0.9	4.1	3.3	7.0	8.5

GDP and its Components (YoY, %)	Q2FY15	Q3FY15	Q4FY15	Q1FY16	Q2FY16	Q3FY16	Q4FY16	Q1FY17
Agriculture & allied activities	2.8	-2.4	-1.7	2.5	2.0	-1.0	2.3	1.8
Industry	6.2	3.4	6.9	7.1	8.5	10.3	9.2	7.7
Mining & Quarrying	7.0	9.1	10.1	8.5	5.0	7.1	8.6	-0.4
Manufacturing	5.8	1.7	6.6	7.3	9.2	11.5	9.3	9.1
Electricity, Gas & Water Supply	8.8	8.8	4.4	4.0	7.5	5.6	9.3	9.4
Services	9.9	11.7	8.3	8.3	7.9	8.5	8.1	8.4
Construction	5.3	4.9	2.6	5.6	0.8	4.6	4.5	1.5
Trade, Hotel, Transport and Communications	8.4	6.2	13.1	10.0	6.7	9.2	9.9	8.1
Finance, Insurance, Real Estate & Business Services	12.7	12.1	9.0	9.3	11.9	10.5	9.1	9.4
Community, Social & Personal Services	10.3	25.3	4.1	5.9	6.9	7.2	6.4	12.3
GDP at FC	8.1	6.7	6.2	7.2	7.3	6.9	7.4	7.3

#### Annual Economic Indicators and Forecasts

Indicators	Units	FY9	FY10	FY11	FY12	FY13	FY14	FY15	FY16E	FY17E	FY18E
Real GDP/GVA growth	%	6.7	8.6	8.9	6.7	4.9	5.6	7.1	7.2	6.8	7.4
Agriculture	%	0.1	0.8	8.6	5	1.2	4.3	-0.2	1.2	4	3
Industry	%	4.1	10.2	8.3	6.7	5.1	0.4	6.5	8.8	5.5	10.6
Services	%	9.4	10	9.2	7.1	6	8.2	9.4	8.2	7.8	7.4
Real GDP	Rs Bn	41587	45161	49185	52475	54821	90844	97275	104272	111362	119603
Real GDP	US\$ Bn	908	953	1079	1096	1008	1503	1595	1604	1662	1772
Nominal GDP	Rs Bn	56301	64778	77841	90097	101133	112728	124882	135762	150594	168176
Nominal GDP	US\$ Bn	1229	1367	1707	1881	1859	1864	2047	2089	2248	2491
WPI (Average)	%	8.1	3.8	9.6	8.7	7.4	6	2	-2.5	3	3
CPI (Average)		9	12.4	10.4	8.3	10.2	9.5	6.4	4.9	4.6	4
Money Supply	%	20.5	19.2	16.2	15.8	13.6	13.5	12	10.3	11	11.5
CRR	%	5	5.75	6	4.75	4	4	4	4	4	4
Repo rate	%	5	5	6.75	8.5	7.5	8	7.5	6.75	5.75	5.25-5.5
Reverse repo rate	%	3.5	3.5	5.75	7.5	6.5	7	6.5	5.75	5.25	4.75-5
Bank Deposit growth	%	19.9	17.2	15.9	13.5	14.2	14.6	12.1	9.7	14	8
Bank Credit growth	%	17.5	16.9	21.5	17	14.1	13.5	12.5	10.7	8	9
Centre Fiscal Deficit	Rs Bn	3370	4140	3736	5160	5209	5245	5107	5351	5339	5045
Centre Fiscal Deficit	% of GDP	6	6.4	4.8	5.7	5.2	4.6	4.1	3.9	3.5	3
State Fiscal Deficit	% of GDP	2.4	2.9	2.1	1.9	2	2.2	2.9	2.4	2.7	2.8
Consolidted Fiscal Deficit	% of GDP	8.4	9.3	6.9	7.6	6.9	7.1	6.6	6.3	6.2	5.8-6
Exports	US\$ Bn	189	182.4	251.1	309.8	306.6	318.6	316.7	266.4	275.7	279.8
YoY Growth	%	13.7	-3.5	37.6	23.4	-1	3.9	-0.6	-15.9	3.5	1.5
Imports	US\$ Bn	308.5	300.6	381.1	499.5	502.2	466.2	460.9	396.4	392.5	412.1
YoY Growth	%	19.7	-2.5	26.7	31.1	0.5	-7.2	-1.1	-14	-1	5
Trade Balance	US\$ Bn	-119.5	-118.2	-129.9	-189.8	-195.6	-147.6	-144.2	-130.1	-116.8	-132.3
Net Invisibles	US\$ Bn	91.6	80	84.6	111.6	107.5	115.2	116.2	107.9	102.9	106.5
Current Account Deficit	US\$ Bn	-27.9	-38.2	-45.3	-78.2	-88.2	-32.4	-27.9	-22.2	-13.9	-25.8
CAD (% of GDP)	%	-2.3	-2.8	-2.6	-4.2	-4.7	-1.7	-1.4	-1.1	-0.6	-1
Capital Account Balance	US\$ Bn	7.8	51.6	62	67.8	89.3	48.8	90	41.1	39	63.4
Dollar-Rupee (Average)		45.8	47.4	45.6	47.9	54.4	60.5	61.2	65.5	67	67.5

Source: RBI, CSO, CGA, Ministry of Agriculture, Ministry of commerce, Bloomberg, PhillipCapital India Research

	Summary	
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		CMP	Mkt Cap	Net Sales	: (Rs mn)	EBIDTA (	Rs mn)	PAT (Rs	(um ;	EPS (Rs)	EPS	Growth (%)	P/!	E (x)	P/B (x)	) E	V/EBITDA	( X)	ROE (%)	-	ROCE (%)	_
Name of company	Sector	ß	Rs bn	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E FY	18E FY1	I 7E FY18E	FY17E	FY18E	FY17E F	(18E FI	V17E FN	/18E	-Y17E FY1	8E FY1	I7E FY1	18E
Tata Motors	Automobiles	452	1,447	2,778,630	3,195,336	446,700	562,265	156,757	230,352	49	72 4	1.8 46.9	9.3	6.3	1.5	1.3	4	3.1	16.5 1	9.9	8.6 1	1.2
Bharat Forge	Automobiles	1,066	248	72,614	80,294	13,685	15,935	6,242	8,008	27	34	4.7 28.3	39.7	31	6.3	5.5	19.2	16.2	15.8 1	7.8 1	2.1 14	4.2
Mahindra & Mahindra	Automobiles	1,318	819	443,257	497,442	58,953	66,906	36,700	42,038	62	71 1	1.5 14.5	21.3	18.6	3.1	2.8	13.8	12	14.7 1.	5.1 1	2.7 1:	3.4
Ashok Leyland	Automobiles	94	267	201,621	238,868	22,794	26,389	12,351	15,063	4	5	1.2 22	21.6	17.7	4.1	3.4	11.4	9.4	18.8	19 1	5.7	17
Apollo Tyres	Automobiles	179	91	133,058	149,745	19,925	21,437	10,308	11,156	20	22 .	.1.4 8.2	8.9	8.2	1.3	1.1	5.5	ъ	14.5 1.	3.7 1	0.9 10	0.5
Maruti Suzuki	Automobiles	6,000	1,813	665,340	753,298	106,188	118,994	73,469	82,496	243	273 6	0.7 12.3	24.7	22	5.5	4.6	16.9	14.9	22.3 21	0.8 2	2.6 2	1.2
Mahindra CIE	Automobiles	203	77	54,170	66,956	6,497	9,384	3,147	5,040	10	13 9	0.4 37.1	20.8	15.2	2.9	1.8	12.3	7.9	14 1.	3.7 1	2.1 2	1.6
Bajaj Auto	Automobiles	2,782	805	220,067	256,225	47,024	54,642	39,729	46,098	137	159	8.8 16	20.3	17.5	5.5	4.6	16.6	14.1	27.3 20	6.5 2	8.1 2.	7.6
Hero MotoCorp	Automobiles	3,102	619	314,421	363,560	53,333	59,632	38,093	42,785	191	214 2	1.6 12.3	16.3	14.5	6.3	5.1	11.5	10.2	38.6	35 3	7.9 3!	5.1
Escorts Ltd	Automobiles	410	50	39,725	45,855	3,187	4,476	2,243	2,972	19	25 11	5.9 32.5	21.8	16.5	2.4	2.1	15.6	10.6	11.1	13	1.7 1:	2.2
Ceat Ltd	Automobiles	1,136	46	60,151	70,844	7,784	9,567	4,294	5,583	105	137 .	6.2 30	10.8	8.3	1.9	1.6	6.2	4.8	17.7 19	9.1 1	7.4 18	8.9
Cummins India	Capital Goods	893	247	51,137	58,296	8,639	10,179	7,897	9,115	28	33	4.7 15.4	31.3	27.1	6.5	9	28.7	24.2	20.8	22 2	0.2 2.	1.3
Engineers India	Capital Goods	148	100	14,387	19,604	3,034	3,669	3,335	3,859	5	6 3	1.2 15.7	29.9	25.8	3.6	3.6	23.3	19.4	12.2 10	3.8 1	3.4 1!	5.1
Siemens	Capital Goods	1,205	429	113,677	114,685	11,405	12,999	6,699	8,025	19	23 1	5.7 19.8	64	53.5	7.8	6.3	35.1	29.8	12.2 1	1.8	9.6 30	9.7
Crompton Greaves	Capital Goods	66	41	60,489	65,839	5,474	6,348	1,933	2,727	m	4	62 41.1	21.4	15.2	0.9	0.8	6.3	5.1	4.1	5.6	3.2	5
VA Tech Wabag	Capital Goods	525	29	30,646	36,765	2,612	3,517	1,220	1,734	22	32 3	7.2 42.1	23.5	16.6	2.7	2.4	11.2	8.4	11.3 1.	4.4	9.1 1	1.2
Voltas	Capital Goods	345	114	60,642	69,762	5,311	6,339	4,407	4,953	13	15 3	9.2 12.4	25.9	23.1	3.5	3.2	21.4	17.7	13.6 1.	3.7	15 1/	4.1
BHEL	Capital Goods	154	377	299,845	345,430	12,599	29,244	9,466	20,956	4	9 -20	4.3 121.4	39.8	18	1.1	1.1	22.1	9.7	2.8	5.9	2.1 4	4.4
ABB India	Capital Goods	1,234	261	86,484	103,243	7,547	10,342	3,612	5,445	17	26 1	1.6 50.7	72.4	48	80	7.3	33.9	25	11	5.1	9.6 10	3.1
Larsen & Toubro	Capital Goods	1,484	1,384	1,110,087	1,274,713	120,994	144,127	57,874	67,262	62	72 3	8.2 16.2	23.9	20.6	2.9	2.6	18.3	15.5	12 1.	2.6	5	5.6
KEC International	Capital Goods	167	43	84,462	91,484	7,607	8,247	2,580	3,102	10	12 1	4.3 20.2	16.6	13.8	2.5	2.2	8.2	7.4	15 1	5.7	9.9 1(	0.6
Thermax	Capital Goods	856	102	47,679	53,138	4,225	5,034	3,118	3,457	26	29 1	3.2 10.9	32.7	29.5	3.9	3.6	23.7	19.5	12 1:	2.1 1	0.4 1	1.3
Inox Wind	Capital Goods	172	38	46,885	51,662	7,025	7,765	4,191	4,578	19	21	-8 9.2	9.1	8.3	1.8	1.5	6.5	5.4	19.3 1	8.2 1	4.1 1;	3.5
Dalmia Bharat Ltd	Cement	1,907	170	81,114	86,858	20,304	23,397	5,248	5,845	59	66 17	4.8 11.4	32.3	29	3.9	3.4	7	9.2	12 1	1.9	8.4	8.6
Shree Cement	Cement	15500	540	90,772	98,584	31,833	35,748	18,381	20,311	528	583 20	3.1 10.5	29.4	26.6	7.1	5.8	16.4	14.2	24 2	1.9 2	3.2 2:	3.1

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		CMP	Mkt Cap	Net Sales	(Rs mn)	EBIDTA (F	(um s	PAT (Rs	(um	EPS (Rs)	Ð	5 Growth (%)	đ	(x)	P/B (x	()	ev/ebitd/	4 (x)	ROE (%)	E	OCE (%)	
Name of company	Sector	Rs	Rs bn	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E FY	I 8E FY	17E FY18E	FY17E	FY18E	FY17E F	Y18E F	-Y17E F.	Y18E F	Y17E FY	18E FY1	7E FY1	8E
Mangalam Cement	Cement	284	8	8,801	9,835	1,168	1,555	280	617	11	23	.237 119.6	27	12.3	1.5	1.3	10.8	7.7	5.4 1	0.9	5.3	8.1
OCL India	Cement	914	52	29,529	33,165	5,857	6,592	3,224	3,721	57	65	57.5 15.4	16.1	14	3.2	2.7	8.4	7	19.5 1	9.3 1	7.5 20	0.6
JK Lakshmi Cement	Cement	388	46	31,203	36,664	4,797	6,257	751	1,817	9	15 2.	21.9 142.1	60.8	25.1	3.2	2.9	13.3	9.7	5.3	1.7	6.3	9.2
JK Cement	Cement	867	61	37,763	45,175	6,005	8,230	1,503	2,999	21	43 1.	37.1 99.5	40.3	20.2	3.6	3.3	14.5	10.4	8.9	6.3	6.4 9	9.1
HeidelbergCement	Cement	111	25	18,244	19,946	2,454	3,182	676	1,164	m	ъ	74.9 72.2	37	21.5	2.6	2.4	12.9	9.3	7.1 1	0.9	9.6	8.6
India Cement	Cement	163	50	60,035	66,592	10,226	11,472	2,601	3,949	∞	13	80.1 50.9	19.2	12.7	1.4	1.3	7.2	9	7.3 1	0.4	7.5 9	9.3
Ambuja Cement	Cement	239	474	98,754	108,682	17,340	21,077	10,163	12,052	9	9	10.3 5.6	41.5	39.3	5.3	5.6	26.5	21.7	12.8 1	4.3	9.9 12	5.7
ACC	Cement	1,469	276	109,456	129,581	11,988	14,977	6,430	7,696	34	41 .	14.5 19.7	42.9	35.9	3.2	3.1	21.4	17.3	7.4	8.6	2 2	7.5
Ultratech Cement	Cement	3,720	1,021	279,403	352,815	54,309	69,379	28,669	29,712	104	108	25.4 3.6	35.6	34.4	4.3	3.9	19.3	17.9	12.2 1	1.4	9.8	8.6
Havells India Ltd	ELECTRICALS	427	267	59,506	67,500	8,118	9,346	5,739	6,540	6	10	11.9 14	46.5	40.8	9.1	8.2	31.3	26.8	19.7	20 1	7.6 18	8.3
Finolex Cables Ltd	ELECTRICALS	445	68	25,780	28,026	4,037	4,573	3,229	3,398	21	22	59.3 5. <b>2</b>	21.1	20	3.9	3.4	16	13.5	18.6 1	6.8 1	9.1 17	7.3
KEIIndustries	ELECTRICALS	182	14	26,328	29,983	2,797	3,231	2,522	2,940	33	38	16.2 16.6	5.6	4.8	3.1	2.6	7	5.9	56	3.4 2	6.6 28	8.3
Bajaj Electricals Ltd	ELECTRICALS	257	26	46,946	50,568	2,605	2,989	1,069	1,284		13	11.8 2C	24.3	20.2	3.1	2.7	11.9	10.2	12.7 1	3.5 1	0.6 11	1.
LIC Housing Finance	Financials	560	282	1,642	1,872	2,624	1,754	19,638	23,422	39	46	18.2 19.3	14.4	12.1	0	0	107.6 1	160.9	213 25	1.8 1	7.6	20
DCB Bank	Financials	137	39	1,866	2,223	950	930	1,936	2,505	7	8	-0.5 15	20.2	17.5	2	1.6	41.2	42.1	8.69	1 1	0.2 10	0.6
Indusind Bank	Financials	1,338	799	36,706	46,472	8,046	9,715	29,659	38,207	50	64	29.3 28.6	26.9	20.9	4	3.4	99.4	82.3	339 39	1 1	5.6 17	7.4
Repco Home Finance	Financials	657	41	364	474	900	601	1,802	2,354	29	37	20 29.8	22.8	17.6	0.1	0	68.5	68.4	178.8 21	2.2 1	7.4 19	9.2
Punjab National Bank	Financials	140	298	33,023	36,326	101,370	81,296	19,045	32,451	6	÷.	43.2 -100	16		0.8	0.7	2.9	3.7	196.2	208	5.1 7	7.8
Bank of Baroda	Financials	166	383	29,585	33,135	83,430	67,044	21,096	49,375	6	21 -1.	39.1 134.1	18.2	7.8	-	0.9	4.6	5.7	180.8 19	9.2	5.7 12	2.4
State Bank of India	Financials	270	2,149	184,269	204,784	283,537	269,311	109,095	134,407	13	16	5.1 20.7	20	16.6	1.4	1.3	7.6	8	197.7 21	2.2	7.2	œ
Union Bank	Financials	142	98	15,220	16,832	48,963	46,540	8,368	14,157	11	17	-44 58	12.9	8.2	0.5	0.5	2	2.1	324.3 32	9.8	4	6.1
Canara Bank	Financials	294	160	17,054	19,027	48,372	43,340	16,073	25,218	28	41 -1.	53.4 49.6	10.6	7.1	6	5.8	3.3	3.7	582.2 59	4.7	5.9 8	8.5
Indian Bank	Financials	292	140	4,764	6,041	18,795	17,880	14,995	16,966	31	35 1	10.8 13.1	9.3	8.3	0.9	0.9	7.5	7.8	366.3 39	6.9 1	0.5 10	0.5
Oriental Bank of Comm	1 Financials	121	42	11,018	12,394	29,240	27,158	5,491	7,243	16	19 2	26.6 20.3	7.6	6.4	0.3	0.3	1.4	1.5	418.3 41	0.3	3.9 4	4.8
ICICI Bank	Financials	282	1,642	99,840	22,400	162,259	121,444	85,083	71,498	15	12 -	12.7 -16.1	19.3	23	1.7	1.7	10.1	13.5	162.7 16	7.6	9.2	7.4

PhillipCapital India Coverage Universe: Valuation Summary

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		CMP	Mkt Cap	Net Sales (	Rs mn)	EBIDTA (R	ts mn)	PAT (Rs	(um	EPS (Rs)	e.	5 Growth (%)	<u>م</u>	E (x)	P/B ()		EV/EBITD	04 (x)	ROE (%	_	ROCE (%	
Name of company	Sector	Rs	Rs bn	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E FY	18E FY	17E FY18E	FY17E	FY18E	FY17E F	Y18E	-Y17E	FY18E	FY17E F	18E F	(17E FY	18E
Shriram Transport Fin	Financials	945	215	716	823	17,165	18,679	17,233	20,661	76	91	46.3 19.9	12.4	10.4	0	0	12.5	11.5	512.9	92.9	16.7	6.5
Shriram City Union Fin	Financials	1,909	126	539	537	7,102	7,697	6,286	8,034	95	122	18.6 27.8	20	15.7	0.1	0.1	17.7	16.4	759.5 8	61.1	13.2	15
AXIS Bank	Financials	490	1,171	82,684	92,879	120,520	100,622	32,977	56,097	14	23	60.1 69.3	35.6	21	0.4	0.4	9.7	11.6	228.8 2	42.8	6.1	9.9
Chola Investment	Financials	1,016	159	296	353	4,108	3,731	7,487	9,981	48	64	31.7 33.3	21.2	15.9	0	0	38.7	42.6	276.5 3	34.2	18.8	0.9
HDFC Limited	Financials	1,404	2,226	4,042	4,365	1,644	1,644	73,588	81,113	47	51	3.7 10.2	30.2	27.4	0	0			241.5 2	70.6	20.4	0.1
Mahindra & Mah Fin	Financials	292	166	2,971	3,217	11,290	8,930	8,286	11,494	15	20	23.2 38.7	19.9	14.4	0	0	14.7	18.6	117.7	33.3	13	16.2
HDFC Bank	Financials	1,375	3,509	105,514	123,893	32,025	38,530	146,510	175,679	58	69	19.2 19.9	23.7	19.8	0.8	0.7	109.6	91.1	333.1 3	89.2	18.7	9.2
SKS Microfinance	Financials	623	86	1,045	1,505	499	590	7,295	8,381	53	60 1:	22.2 13.7	11.8	10.3	0	0	172.2	145.6	207.9 2	66.1	34.4	5.5
Manappuram Finance	Financials	103	86	17,952	22,649	9,435	12,425	5,955	7,830	7	6	76.6 31.5	14.5	11	2.7	2.3	9.2	7	20.1	22.3	4.5	4.9
Muthoot Finance	Financials	349	139	29,972	34,858	18,191	21,430	11,592	13,627	29	34	43.2 17.6	12	10.2	2.1	1.8	7.7	6.5	19.1	19.4	4	4.1
Asian Paints	FMCG	965	926	164,341	188,343	31,859	35,405	20,334	22,752	21	24	14.3 11.9	45.5	40.7	14	12.1	28.8	25.7	30.8	29.6	31.4	0.2
Hindustan Unilever	FMCG	843	1,824	322,609	363,026	65,022	72,675	42,027	47,864	19	22	2.5 13.9	43.5	38.2	46.2	41.8	27.7	24.7	106.1 1	09.6	17.2 12	1.8
Bajaj Corp	FMCG	368	54	8,709	9,631	2,692	2,979	2,438	2,631	17	18	0.2 7.9	22.3	20.6	11.6	11.9	19.9	18.1	52.3	57.8	48.5	57
ITC	FMCG	269	3,255	388,213	427,304	149,626	168,404	103,012	114,830	6	10	9.6 11.5	31.3	28.1	9.4	8.9	21.3	18.9	29.8	31.7	23.2 2	4.5
Emami	FMCG	1,085	246	28,121	31,637	8,047	9,198	5,602	6,466	25	28	5.8 15.4	44	38.1	16.8	15.2	31.2	27.2	38.1	39.8	18.3	3.3
Nestle	FMCG	6,240	602	101,096	112,742	21,507	24,159	12,459	14,162	129	147	17.1 13.7	48.3	42.5	18.2	15.8	27.8	24.3	37.6	37.2	40.5	39.7
Jubilant Foodworks	FMCG	992	65	26,187	29,231	2,630	3,018	889	1,102	14	- 11	22.4 23.9	73	58.9	7.6	6.7	24.6	21	10.4	11.4	10.4	1.5
Marico Industries	FMCG	268	345	65,107	73,527	12,389	14,084	8,573	9,762	7	80	18.3 13.9	40.3	35.4	13.7	11.5	27.4	23.8	34	32.5	31.7	80.8
Colgate	FMCG	914	249	43,472	49,506	10,005	11,546	6,010	6,934	22	25	-1.1 15.4	41.4	35.9	19.2	15.3	24.6	21.1	46.4	42.6	52 4	17.5
Agro Tech Foods	FMCG	536	13	8,066	8,585	651	769	316	421	13	17	35.2 33.1	41.3	31	3.6	3.3	20.7	17.2	8.7	10.7	8.2	8.9
Dabur India Ltd	FMCG	266	468	86,850	96,506	15,605	17,221	12,800	14,269	7	8	2.2 12.5	36.5	32.5	9.6	8.2	29.9	27	26.3	25.4	24.3	3.8
Godrej Consumer Pro	FMCG	1,613	549	101,171	112,021	18,447	20,852	12,895	14,922	38	44	12.5 15.7	42.6	36.8	6	7.6	30.6	26.6	21.2	20.7	16.5	17.2
Britannia	FMCG	3,241	389	93,599	105,653	12,116	14,203	8,943	10,404	75	87	9.6 16.3	43.5	37.4	16.8	13.1	31.8	26.8	38.6	35.2	40.9	1.4
Apcotex Industries	FMCG	326	7	5,640	6,557	798	1,074	500	691	24	33	30.2 38	13.5	9.8	3.1	2.5	8.1	5.2	22.7	25.8	25 2	8.7
Glaxo Smithkline Con	FMCG	5,106	215	39,742	42,703	8,427	9,403	7,014	7,747	167	184	-0.7 10.5	30.6	27.7	7.8	6.9	21.8	19	25.3	24.8	26.9	6.3

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		CMP	Mkt Cap	Net Sales	(Rs mn)	ebidta (r	(um s	PAT (Rs	(um	EPS (Rs)	EPS	Growth (%)	P/	E (x)	P/B (x		EV/EBITD.	A (x)	ROE (%)		ROCE (%	~
Name of company	Sector	Rs	Rs bn	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E FY18	E FY1	7E FY18E	FY17E	FY18E	FY17E F	Y18E F	Y17E F	Y18E	FY17E FY	18E FY	17E FY	18E
PNC Infratech Ltd	Infrastructure	105	27	20,142	24,170	2,618	3,190	1,971	1,849	8	7 -1;	7.7 -6.2	13.7	14.6	1.7	1.6	10.4	8.5	13.6	11.3	13.4 1	11.1
GMR Infrastructure	Infrastructure	14	85	94,388	94,438	33,267	35,629	-28,985	-25,388	'n	5 7(	0.7 -12.4	-2.6	'n	2	5.5	15.1	13.6	-73.7 -18	32.4	-0.6	-0.1
GVK Power	Infrastructure	7	11	48,605	51,068	28,264	28,952	-3,136	-2,543	-2	·2 -5;	3.9 -18.9	-3.3	-4.1	0.7	0.7	8.4	7.9	-21.7	16.8	3.4	3.5
KNR Construction	Infrastructure	180	25	13,087	16,359	1,832	2,290	1,209	1,364	6	0	85 12.8	20.9	18.5	ę	2.6	14.7	11.9	15.4	15	14.1 1	13.6
NCC	Infrastructure	82	46	88,468	99,079	8,183	9,165	2,785	3,708	5	7 1;	7.5 33.1	16.4	12.3	1.3	1.1	7.4	6.7	7.6	9.3	10.3 1	11.1
ITD Cementation	Infrastructure	161	25	37,158	40,874	3,158	3,474	1,261	1,497	80	0 8.	9.8 18.6	19.7	16.6	3.6	2.9	9.1	8.3	18	17.6	16.5 1	16.6
Ashoka Buildcon	Infrastructure	192	36	30,066	35,089	8,938	10,989	1,087	1,214	9	6 1(	).5 11.6	33	29.6	1.8	1.7	8.6	7	5.5	5.9	5.7	6.4
Adani Ports & SEZ	Infrastructure	298	617	84,450	94,589	55,535	62,504	37,017	41,420	18 2	0	30 11.9	16.7	14.9	3.7	e	14.9	13	22.1	20.1	11.6 1	11.6
IRB Infrastructure	Infrastructure	227	80	57,142	63,658	30,815	35,748	6,734	6,561	19	6	5.9 -2.6	11.9	12.2	1.4	1.2	7.6	6.6	11.5	9.9	3.6	3.8
Ahluwalia Contracts	Infrastructure	297	20	13,808	15,879	1,864	2,144	1,001	1,226	15 1	8 16	3.5 22.6	19.9	16.2	3.9	3.3	10.9	9.1	21.5	22	20 2	20.9
Hindustan Constructior	1 Infrastructure	39	39	36,188	41,616	4,343	4,994	-1,276	2,005		2 -18	3.3 -257.1	-30.9	19.7	1.5	1.4	13.6	10.4	-5.6	7.3	4.7	7.4
Mindtree Ltd	IT Services	475	80	52,286	58,027	7,116	8,294	4,107	5,428	26 3	2 -19	9.4 23.6	18.2	14.7	2.8	2.7	1	9.3	15.5	18.3	17.3 1	19.3
Wipro	IT Services	479	1,165	548,281	578,512	112,324	116,869	83,199	89,682	34 3	5- 12	5.5 8.3	14	13	2.3	2.1	11.4	10.6	16.7	16.1	15.9 1	15.7
NIIT Technologies	IT Services	426	26	27,710	30,444	4,574	5,088	2,593	2,917	42 4	œ	3.1 12.4	10	8.9	1.5	1.4	4.2	3.3	15.2	15.3	12.9	15
Infosys Technologies	IT Services	1,005	2,308	689,083	771,203	187,458	211,257	144,440	164,449	63 7	.2	7 13.9	15.9	14	3.4	с	10.2	8.8	21.2	21.3	22.1 2	22.6
Tata Consultancy	IT Services	2,412	4,753	1,188,280	1,295,824	326,828	343,999	264,902	275,357	134 14	0	9.4 3.9	17.9	17.3	5.7	4.9	14.5	13.5	32	28.3	33 2	29.6
HCL Technologies	IT Services	839	1,184	530,604	567,387	114,765	121,025	89,906	95,640	63 (	1	3.8 6.4	13.3	12.5	3.4	с	10.1	9.4	25.2	24	25 2	23.8
Persistent Systems	IT Services	630	50	28,986	32,029	4,585	5,233	3,099	3,460	39 4	۲ ۲	4.2 11.6	16.2	14.6	2.6	2.3	10.7	9.3	16.2	16.1	16 1	15.8
KPIT Technologies	IT Services	132	26	33,087	35,534	3,628	4,282	2,196	2,593	11	4 -2;	3.9 18.1	11.5	9.7	1.6	1.4	6.8	5.4	13.8	14.2	14.4	12.9
Tech Mahindra	IT Services	504	491	293,050	320,768	44,036	50,112	29,803	32,613	34	2	2.6 9.4	14.8	13.5	2.8	2.5	11	9.4	19.2	18.4	15.3 1	14.9
Allcargo Logistics	Logistics	164	41	56,674	61,740	4,788	5,943	2,248	3,007	6	2 -19	7.2 33.7	18.4	13.7	2.4	2.1	9.5	7.7	13	15.3	9.3	12.7
VRL Logistics Ltd	Logistics	294	27	18,056	19,661	2,335	2,657	836	1,042	6	1 -18	3.3 24.7	32.1	25.7	4.9	4.6	12.4	10.7	15.4	17.8	11.1	13.2
Container Corp Of India	a Logistics	1,230	240	55,481	61,739	10,115	11,968	7,253	8,410	37 4	:- :	7.9 16	33.1	28.5	2.7	2.6	23.2	19.5	8.3	9.1	8.2	8.9
Navkar	Logistics	161	23	4,646	7,908	1,975	3,161	1,193	2,047	80	4	5.8 71.6	19.3	11.2	1.6	1.4	13.4	8	8.3	12.2	7.9 1	11.5
Gateway Distripacks	Logistics	255	28	10,902	12,342	2,411	3,262	1,081	1,782	10	. 9	1.3 64.9	25.6	15.5	2.9	2.7	13.9	10.3	11.3	17.2	8.3	11.9

PhillipCapital India Coverage Universe: Valuation Summary

Summary
Valuation
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		CMP	Mkt Cap	Net Sales (	(Rs mn)	EBIDTA (I	Rs mn)	PAT (Rs	(um	EPS (Rs)	EPS	Growth (%)	P/	E (x)	P/B ()	0	EV/EBITD	A (x)	ROE (%)		ROCE (%)	_
Name of company	Sector	ß	Rs bn	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E FY1	IBE FY	I7E FY18E	FY17E	FY18E	FY17E F	Y18E F	Y17E F	Y18E	FY17E FY	18E FY	17E FY1	18E
Zee Entertainment	Media	520	499	65,355	67,083	17,749	22,115	10,784	15,312	11	16 1	8.1 42	46.3	32.6	7.1	4.8	27	20.1	15.4 1	4.7	17.4 1	8.2
DB Corp Limited	Media	378	69	22,761	25,196	6,484	7,586	3,814	4,690	21	26 2	8.3 23	18.2	14.8	4.5	4	10.5	8.7	25 2	6.8	22.5 2	4.6
Jagran Prakashan	Media	190	62	22,853	24,721	6,265	7,084	3,656	4,266	12	13 1	1.4 16.7	16.5	14.1	3.1	2.7	10.1	8.4	19.1	9.3	15.8 1	5.6
HT Media	Media	82	19	27,311	29,520	3,781	4,329	2,310	2,750	10	12 3	2.6 19	8.3	6.9	0.8	0.7	6.6	2	9.9	0.4	9.1	9.3
Dish TV	Media	88	94	30,446	34,089	10,324	12,614	2,729	3,844	с	4 -6	1.3 40.9	34.3	24.3	14.1	8.9	9.2	7.3	41.1	6.7	51.3 4	0.1
HMVL	Media	270	20	9,343	10,320	1,913	2,320	1,824	2,139	25	29	0.7 17.3	10.9	9.3	1.8	1.5	10.1	7.5	16.9	6.7	19.2 1	8.8
Ortel Communication	Media	120	4	2,533	3,025	844	1,084	125	88	4	e	4.2 -29.9	29	41.4	2.4	2.3	6.4	4.9	8.3	5.5	8.5	8.1
NALCO	Metals	65	126	72,089	77,808	12,945	14,162	9,019	9,765	5	5 7	7.5 8.3	13.9	12.9	1.2	1.1	7.6	7.6	8.6	8.9	6.7	7.8
SAIL	Metals	60	248	427,690	508,894	16,075	40,607	-14,663	-1,844	4	9-0	4.4 -87.4	-16.9	-134.5	0.7	0.7	35.3	15.2	-3.9	0.5	0	1.7
Tata Steel	Metals	470	456	1,141,936	1,343,417	152,526	186,759	35,127	64,668	36	67 27	9.1 84.1	13	7.1	1.5	1.3	8.2	6.4	11.4	7.8	4.8	6.7
Vedanta Ltd	Metals	264	783	720,078	847,756	210,679	252,322	48,186	83,511	16	22	54 38.2	16.2	11.7	1.6	1.3	-	5.5	10.1	0.8	7.5	9.4
JSW Steel	Metals	187	451	560,481	617,282	125,234	139,556	36,024	44,652	15	18 16	0.4 23.9	12.5	10.1	2.1	1.8	7.1	9	16.9	7.6	8.9	9.4
Hindustan Zinc	Metals	302	1,275	174,849	194,319	96,157	117,663	83,178	103,441	20	24	1.5 24.4	15.3	12.3	с	2.6	10.3	7.8	19.5	21	19.6 2	0.9
Hindalco Inds	Metals	184	380	1,034,837	1,071,588	131,922	137,352	30,064	33,525	15	16 28	5.5 11.5	12.6	11.3	0.9	0.9	7.4	6.7	7.3	7.6	5.4	5.5
Sintex Industries	Midcap	94	49	91,007	108,439	16,345	20,034	6,408	8,378	12	16 -1	3.9 30.7	7.7	5.9	0.7	0.7	7.3	6.2	9.7 1	1.4	6.3	7.1
KDDL	Midcap	182	2	4,760	5,513	279	459	30	97	e	10	-44 228.4	61.8	18.8	2.3	2.1	12	7.5	3.7 1	1.4	4.6	7.8
Pennar Inds.	Midcap	43	5	15,352	19,052	1,918	2,411	672	893	9	7 5	3.3 32.9	7.6	5.7	0.9	0.8	3.9	3.1	11.9	14	14.2 1	5.9
Praj Inds.	Midcap	78	14	11,257	14,084	1,162	1,931	662	1,354	5	8	6.8 69.5	17.4	10.3	2.1	1.9	11.2	6.7	12 1	8.3	11.5 1	8.2
PEBS	Midcap	126	4	5,496	6,897	776	971	379	482	11	14 1	8.3 27.1	11.4	8.9	1.8	1.6	6.1	5.1	15.9 1	7.6	14.8 1	5.9
Indraprastha Gas	Oil & Gas	1,039	145	37,965	37,552	10,040	10,899	5,790	6,568	43	47 3	8.5 10.3	24.4	22.1	5.1	4.4	13.6	12.3	21 1	9.9	17.8 1	7.5
Petronet LNG	Oil & Gas	390	292	256,120	317,108	23,548	29,133	13,617	17,201	18	23 2	7.4 26.3	21.5	17	4	3.4	12.5	9.8	18.5	20	13.3 1	5.6
Gujarat State Petronet	Oil & Gas	164	93	10,603	12,522	9,215	11,029	4,989	6,219	6	11 1	2.2 24.6	18.5	14.9	2.1	1.9	10.2	8.2	11.5 1	2.9	9.4 1	0.7
GUJARAT GAS LTD	Oil & Gas	617	85	47,203	52,594	8,705	10,008	2,926	3,668	21	27 4	7.4 25.3	29	23.2	3.7	3.3	12.3	10.7	12.6 1	4.1	7.5	œ
Reliance Industries	Oil & Gas	1,074	3,484	3,079,673	3,807,884	462,012	565,352	284,344	224,753	96	76	4.4 -21.1	11.2	14.1	1.2	1.1	12	11	10.6	7.8	6.7	5.2
GUJARAT GAS LTD	Oil & Gas	617	85	47,203	52,594	8,705	10,008	2,926	3,668	21	27 4	7.4 25.3	29	23.2	3.7	3.3	12.3	10.7	12.6 1	4.1	7.5	8

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		CMP	Mkt Cap	Net Sales (	Rs mn)	EBIDTA (R	s mn)	PAT (Rs r	(uu	EPS (Rs)	Ë	Growth (%	(0	P/E (x)	P/B (:	(x	EV/EBITD.	A (x)	ROE (%)	RC	)CE (%)	
Name of company	Sector	Rs	Rs bn	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E FI	18E FY	17E FY18	E FY17	E FY18E	FY17E	с <b>ү18</b> Е	FY17E F	Y18E	FY17E FY18	E FY17	E FY18E	ш
Castrol India	Oil & Gas	434	215	37,133	40,744	10,538	11,608	7,084	7,839	14	16	9.1 10	7 30.	3 27.4	30.2	27.2	19.6	17.7	99.6 99.	3 107.	3 104.8	~
Gulf Oil Lubricants	Oil & Gas	695	34	11,423	13,266	1,815	2,172	1,195	1,445	24	29	19.1 2	1 28.	8 23.8	10.8	8.6	18.8	15.6	37.6 3	6 28.	1 29.4	<del></del>
Cadila Healthcare	Pharma	449	460	94,489	116,314	19,795	26,579	13,251	18,276	13	18	-10 37	.9 34.	7 25.2	7.2	5.9	23.9	17.6	19.9 22.	4 14.	3 17	
Sun Pharma	Pharma	670	1,606	320,223	348,598	108,972	125,059	71,519	82,596	30	34 2	3.6 15	5 22.	5 19.5	4.3	3.6	13.4	11.2	19.1 18.	5 1	6 16	<i>2</i> 0
Dr Reddy's Labs.	Pharma	2,920	484	141,792	156,917	27,649	36,875	13,793	21,184	81	124 -3	31.7 53	.6 36.	1 23.5	4.1	3.6	18.5	13.5	11.3 15.	-	7 10.7	
Aurobindo Pharma	Pharma	664	389	154,569	180,376	37,097	45,815	23,759	29,253	41	50	6.5 23	.1 16.	3 13.2	4.2	3.3	11.3	9.1	26 24.	9 24.	5 24.3	m
Cipla Ltd	Pharma	594	478	15,149	17,556	3,863	4,740	1,413	1,901	18	24	-9.9 34	.6 33.	8 25.1	3.6	3.2	124.8	101.6	20.8 22.	œ	•	
Ipca Laboratories	Pharma	530	67	32,197	38,184	5,016	7,123	2,380	4,288	19	34	14.7 80	2 27.	9 15.5	2.6	2.2	14.1	9.7	9.4 14.	5 7.	5 12.3	~
Divi's Laboratories	Pharma	745	198	44,131	51,593	16,117	19,812	11,870	14,045	45	53	9.2 18	.3 16.	7 14.1	3.8	3.2	12.2	10	23 22.	Б		
Glenmark Pharma	Pharma	947	267	91,779	101,909	22,884	24,733	13,052	15,322	46	54 4	11.9 17.	4 20.	5 17.4	4.9	3.8	12.9	11.7	23.7 2	2 16.	3 16.7	~
Lupin	Pharma	1,460	659	168,586	192,620	45,367	53,828	28,673	34,590	64	77 2	9.6 20	6 22.	9 19	4.9	4	15.3	12.5	21.3 20.	6	•	
Biocon	Pharma	1,107	221	39,496	47,701	9,725	10,551	6,112	5,166	31	26	35.6 -15.	5 36.	2 42.8	4.6	4.3	23.2	21.6	12.4 9.	5	•	
Titan Company	Retail	426	378	128,390	146,821	11,986	14,271	7,785	9,640	6	11	12.9 23.	8 48.	5 39.2	8.9	7.7	31.4	26	20.1 2	1 20.	7 21.6	
Atul Ltd	Specialty Chm	2,220	66	28,860	32,128	5,195	5,976	2,982	3,507	100	118	0.7 17.	<b>6</b> 22.	1 18.8	4.3	3.6	12.7	10.6	19.4 18.	6		
Camlin Fine Sciences	Specialty Chm	98	10	5,593	7,490	895	1,438	227	599	2	r 9	163.	9 41.	7 15.8	4.9	3.8	13.8	9.2	14.4 26.	~	•	. 1
Meghmani Organics	Specialty Chm	41	10	16,014	17,484	3,139	3,584	67	1,133	4	4	17 17	2 10.	8 9.2	1.4	1.2	4.7	3.9	13.1 13.	4 11.	2 12.1	-
Vinati Organics	Specialty Chm	739	38	7,167	8,379	2,157	2,609	1,356	1,670	26	32 ,	11.3 23	1 28	1 22.8	5.9	4.8	17.6	15.3	20.8 2	-		. 1
Aarti Industries	Specialty Chm	794	65	31,676	36,208	6,905	8,074	3,443	4,132	42	50	34 2	0 18.	9 15.8	5.1	4.1	11.5	9.9	28.3 2	6	•	
SRF Ltd	Specialty Chm	1,554	89	50,103	56,097	10,672	12,061	5,120	5,947	89	104	18.1 16	2 17.	4 15	2.9	2.5	10.3	9.1	15.3 1	5 9.	5 10	
Bharti Airtel	Telecom	364	1,453	990,357	1,063,683	349,654	378,037	37,404	57,520	6	14	-4.2 53	8 38	9 25.3	2.1	1.9	7.5	7	5.4 7.	5 5.	5 5.9	6
Idea Cellular	Telecom	106	380	394,873	412,429	139,155	138,427	13,347	2,309	4	1	56.4 -82	7 28.	4 164.3	1.4	1.4	5.6	9	4.9 0.	9 4.	7 3.5	
Tata Communications	Telecom	747	213	220,447	237,790	36,115	40,386	1,401	3,882	5	14	35.7 177	.1 15	2 54.8	-41.5	-79.2	8	6.9	-27.3 -144.	5 4.	8 6.6	<u>``</u>
Bharti Infratel	Telecom	309	572	84,732	88,529	58,942	61,502	26,398	28,609	14	15	3.5 8	4 21.	7 20	3.4	3.3	8.7	8	15.7 16.	6 11.	8 12.8	m

# PhillipCapital India Coverage Universe: Valuation Summary

Source: PhillipCapital India Research Estimates

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