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# CMAs' INDUSTRY BULLETIN

**FEBRUARY 2019**

## THE INSTITUTE OF COST ACCOUNTANTS OF INDIA

**Statutory Body under an Act of Parliament**

Behind every successful business decision, there is always a CMA

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"The CMA Professionals would ethically drive enterprises globally by creating value to stakeholders in the socio-economic context through competencies drawn from the integration of strategy, management and accounting."

## VISION STATEMENT

"The Institute of Cost Accountants of India would be the preferred source of resources and professionals for the financial leadership of enterprises globally."

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# CHAIRMAN'S MESSAGE

**CMA Biswarup Basu**
Chairman
Members in Industry Committee

***Greetings!!!***

It is heart warming and appreciating to note that the 'CMAs Industry Bulletin' has received overwhelming acceptance and admiration from all quarters including the readers from various industries. The members in the Committee feel honoured for this gesture from the readers and we assure you that we will continue to try and deliver quality for our esteemed readers.

In the present age of digital advancement and industrial automation, Blockchain concept is a very relevant aspect. In the current regulatory environment, Indian developers do not have the ability to develop open blockchain solutions at scale. Serious Blockchain professionals are migrating rapidly to countries with more friendly regulations. As a result India's ability to benefit from jobs, capital, local innovation and positioning is all curtailed without the talent ecosystem in place. We are living in a Volatile, Uncertain, Complex and Ambiguous world. A Cost Management Accountant should be equipped to address disruption. A CMA should also be familiar with latest technologies such as Artificial Intelligence, Blockchain, Cyber security and Data Analytics.

The e-journal would continue to publish high quality articles from industry experts, provide columns on industry focus and economy updates for our beloved readers. I should thank our submitting authors who through their valuable articles are discussing critical contemporary matters of the industries. Thank you all for your effort and contribution as we work towards our goal together.

With Warm Regards,

**CMA Biswarup Basu**
12th February, 2019

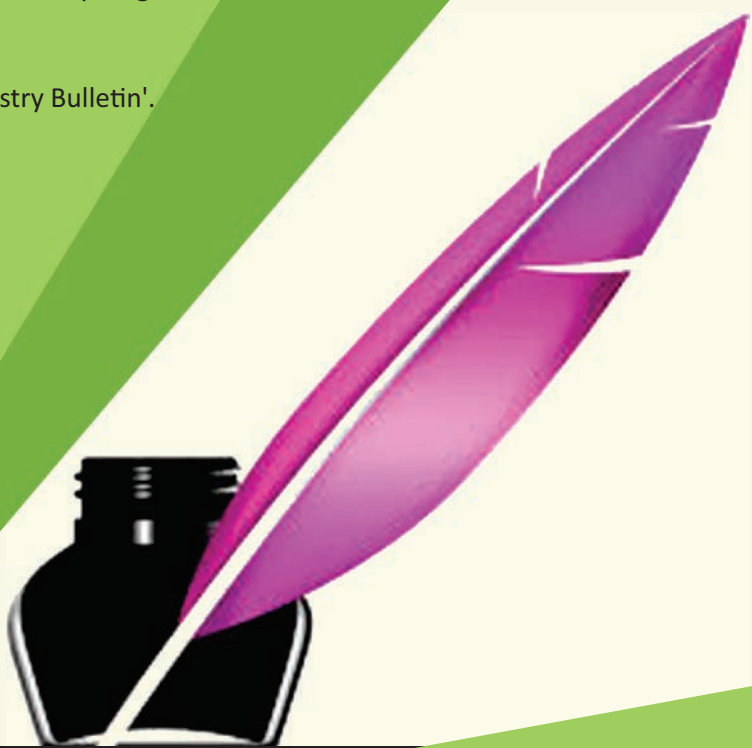
# EDITORIAL PREFACE

***Greetings!!!***

We are glad to place before our esteemed readers the third issue of 'CMAs Industry Bulletin'. We hope that our readers have enjoyed the first two issues and that it has been informative for everyone in the industries. We will always be happy to receive your valuable feedback on the issues being released.

In this issue we have incorporated matters related to Blockchain Technology. The concept of Blockchain has been in existence for a quite a while and is very much relevant in this era of Internet of Value. The concept is that ownership of digital assets of any type - money, deeds, government records, financial instruments, or art - could be securely stored, tracked and transacted. Many of the jobsites have already started demanding knowledge of Blockchain as a growing skill set especially for the developers' jobs. With the digital revolution of advanced technologies taking place everywhere, we are moving towards faster and analytical industrial operations at every stage of production and services.

Hope you will enjoy reading this issue of 'CMAs Industry Bulletin'.



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# BLOCKCHAIN GOVERNANCE: A CHALLENGE AND AN OPPORTUNITY

**CMA Raghabendra Ray**
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Blockchain experiments in governance, particularly in government sector, are picking up the pace globally. Presently more than 20 countries around the world including Canada, UK, Brazil, China and India are running pilots so as to implement blockchain in public service provision and procurement as a way to improve their services and performance. Though it will take time to become pervasive, but the potential benefits of blockchain are so strong that it cannot be ignored. In the government sector, blockchain technology can be used in different areas of governance, e.g. Accounting, Education, Healthcare, Defense, Digital Identity, etc. The potential of blockchain technology is enormous and it can make a critical contribution to fight against corruption, strengthen integrity in the public sector and restore trust in government, but we must be mindful of its requirements and limitations. Blockchain technology will not solve all government problems because there are so many barriers in its adoption. Before deploying blockchain, it is important that governments must conduct a feasibility study of blockchain-based solutions, and the value these can add. The requirements and implications of blockchain in the public sector, however, are yet to be fully understood. It will take several years to go from pilot programs to broader, government-wide applications. Blockchain will bring a new technological paradigm provided governments capitalize this technology and get support from its stakeholders.

**Introduction:**

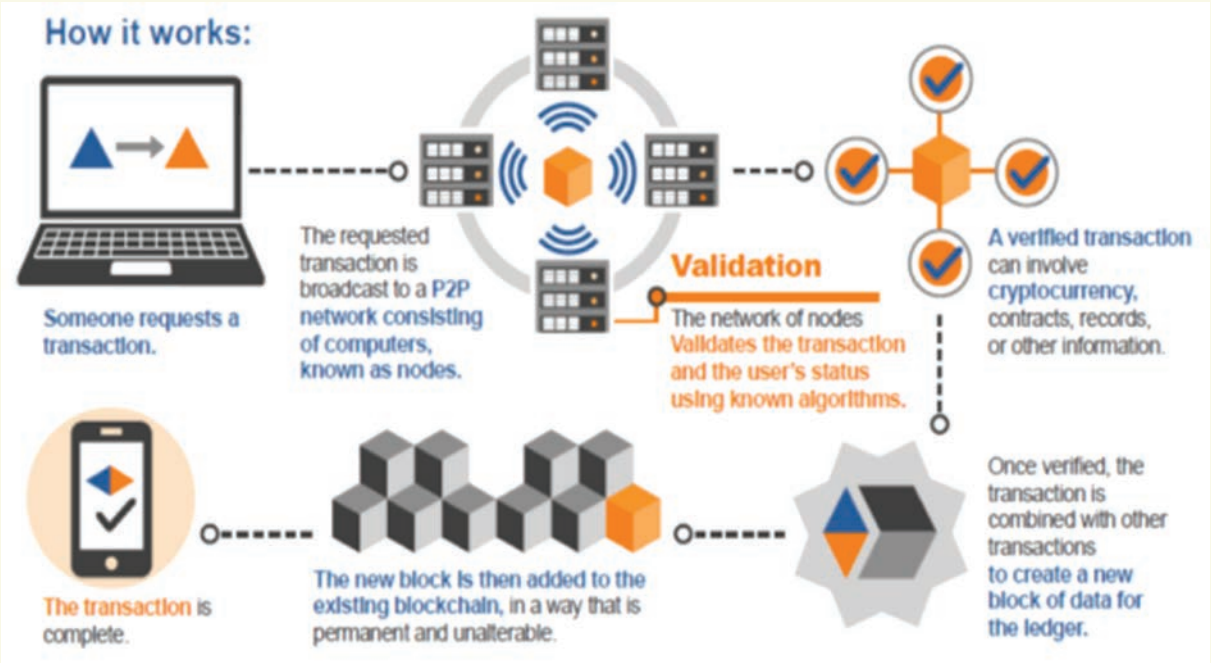
Governments around the world are going digital, embracing digital innovations to modernize their bureaucracies and recast their relations with citizens. These digitization efforts are laying foundation for executing blockchain technology in different fields of governance. The governments that have not yet digitalized their records the costs of blockchain outweigh the potential benefits. Blockchain experiments in governance, particularly in government sector, are picking up the pace globally. Presently agencies in more than 20 countries around the world including Canada, UK, Brazil, China and India are running pilots so as to implement blockchain in public service provision and procurement as a way to improve their services and performance. The British government has recognized that this technology could transform the conduct of public and private sector organizations. The Digital India campaign launched by Government of India will facilitate use of blockchain technology in governance by digitally empowering citizens and strengthening e-governance. NitiAayog is working on building India's largest blockchain network naming "Bharatchain", with a view to reduce frauds, speed up enforcement of contracts and increase transparency of transactions. The increasing adoption of blockchain is inevitable. Though it will take time to become pervasive, but the potential benefits are so strong that it cannot be ignored. In the government sector, blockchain technology can be used in different areas of governance, e.g. Accounting, Education, Healthcare, Defense, Digital Identity, etc. The present paper will focus on blockchaingovernance in public sector and allied services.

**Objectives of the paper:**

1. To understand the Blockchain Technology
2. To know the benefits of using blockchain in governance
3. To examine the existing and proposed areas of applications of blockchain in governance
4. To examine the challenges to blockchain governance

**The Blockchain Technology and its functioning:**

Traditionally organizations have recorded transactions in ledgers and kept them in their own custody to protect their accuracy and sanctity. While conducting business these organizations maintain their own separate record to independently verify information. Blockchain technology is essentially a series of encrypted records chained together over a distributed ledger that chronologically records transactions with identical copies maintained on multiple computer systems controlled by different entities. Any one participating in a blockchain can review the entries in it, but can update the blockchain only by consensus of a majority of network participants (called nodes), thereby creating a continuous mechanism of control regarding manipulation, errors, and data quality. The database does not have a central administrator. Every data block in the ledger is linked to the previous block by a cryptographic algorithm called a hash, with the linked blocks forming a chain, which is called "Blockchain." Each user holds a copy of the distributed ledger on their own computer and the data is replicated and synchronized across all copies of the ledger in real time. If one of the computers holding a copy of the distributed ledger fails or comes under attack, the other computers continue to maintain the database. The following figure depicts the Blockchain Technology and its functioning:




*Source*: https://www.pwc.com

**Benefits of using Blockchain in Governance:**

- *An open source system*: As all transactions that take place are added to the public ledger the problem that could arise by using multiple ledgers can be minimized. As the blockchain is totally open source anybody can tinker it in accordance to their needs. This fosters creativity and allows for further advancement.
- ·*Longevity, durability and reliability:* Blockchain works on a decentralized network. So there is no question of central point failing. This will help prevent possible attack. The peer to peer network of blockchain builds trust without institutions.
- *Low transaction cost*: In blockchain there is no need of third parties and no overhead cost during exchange of assets. As a result transaction costs are lower
- *High transaction speed*: The time required to add a transaction to the blockchain is much lesser than any traditional systems using bank or other institutions. The transaction time is reduced to mere minutes instead of several days, and can transact 24×7.
- *High quality data*: Each and every data accommodated in blockchain is complete, timely, accurate, widely available, and consistent.

- *Transparency and immutability*: Blockchain promises a new era of transparency by providing a copy of the ledger to every users of the network. It is so transparent that everybody can see each and every public changes that were made to it. But nobody can alter or delete these changes i.e. they are immutable.
- *Near real time*: Blockchain enables the near real time settlement of record transactions, removing friction, and reducing risk. It provides unbroken and timely record of information. Real time transparency across the network ensures trust.
- *Govt. red tape thinning*: Blockchain would remove almost all forms of validating by government because a blockchain would keep track of any financial transaction that you would need to keep track of. It would keep track of all physical transactions that are required to upload into the network once and make transaction of that over the network. In this way it helps in reducing red tape.
- *Smart contracts*: A smart contract is an agreement that can automatically trigger actions under certain conditions, such as when payments are made or missed. It could cut legal and administrative costs by being self-enforceable, i.e. without involvement of an intermediary.
- *Storage*: The distribution of data throughout the blockchain network enables the protection of important files. This decentralized process of file storage on the network offers a significant advantage because it does not permit data loss.
- *Control of identity*: The need to manage users' identities is very much imperative. Identity verification is a source of credibility in online transactions. However, risks related to security have caused worry among participants. Distributed ledgers, as found on the blockchain, have advanced the methods of proving one's identity; this includes the provision of digitalized personal bio-data and documents.
- *Protection against fraud*: Until now, financial institutions have had to complete rigorous processes for every one of their new customers to certify their intentions and identities. These hectic processes, commonly known as AML (Anti Money Laundering) and KYC (Know Your Customers) policies, can, and will, eventually be practiced within the blockchain network. The cost of KYC will be significantly reduced due to the verification process within the blockchain.

**Application of Blockchain in different areas of Governance:**

1. **Accounting, Auditing and Taxation**: As soon as the blockchain based distributed database and the related data management technology were invented the scope of its application in accounting, auditing and taxation purposes also increased. This technology is designed in such a way that it can extend the possibilities to keep records and to boost public confidence in accounting information. It is also important to elucidate the perspective of the role that auditor's play in verifying the reliability of financial and other business reporting data in the context of the use of blockchain technology. It is proved that such distributed database is a technology of working with information, keeping intact the fundamental principles of accounting and auditing. Accountants need to understand what exactly blockchain technology is, and how it might change their profession. This technology will lead to changes in not only how audits are performed, but will also drastically reduce the amount of time needed for verification. Tax authorities can apply blockchain in a number of areas to reduce the administrative burden and collect tax at a lower cost, helping to narrow the tax gap and boost tax compliance. The foundation for the spread of blockchain technology is internet and encryption that secures transactions and records. Its internet based decentralized platform will make tracking and monitoring the inflows and outflows from a business easy. As every transaction is encrypted, the involved participants are identified by a string of characters. If the participants in a certain transaction are identified, the time and date of the transaction is verified, and the associated data is secured, the possibility of errors decreases dramatically. At present doctors are increasingly able to monitor the health of patients in real time because of advances in technology. Similarly, blockchain technology will help enable accountants to monitor financial performance in real time. Though, in the short run, it may definitely place some current accounting job in jeopardy, but will also provide numerous opportunities for accounting practitioners in the long run.

2. **Financial services**: Blockchain is undoubtedly one of the most talked about technologies in the financial services industry today. It is a decentralized and

distributed ledger technology to ensure data security, transparency, and integrity. The technology is deemed to have great potential in the finance industry because data cannot be tampered with or forged. It is driving innovation in financial markets, unleashing new opportunities to establish trust, simplicity and efficiency that encourages growth. Information stored in blockchain can dramatically reduce the cost and complexity of financial activities. It can speed up transaction times while reducing errors, misinterpretations, disputes and fraud. Central banks, commercial banks, insurers, stock exchanges, regulators, and many other financial services players are keenly exploiting blockchain's potential to create smart contract between parties. Blockchain based smart contracts can help automatically store, secure and exchange contract details and financial terms; coordinate trade logistics and payments on an integrated real-time network; and streamline digital trade processes. Blockchain solutions are enhancing banking experiences for customers by reducing transaction times from hours to seconds, removing manual processes, and reducing friction in day to day trade finance, digital identities and cross-border payments. Blockchain supports KYC due diligence, helps secure personal information, enhances client satisfaction, decrease duplicate information, ease administrative effort and reduces cost. With the help of blockchain, banks can create smooth, secure, low cost and high volume cross border payments without sacrificing margins irrespective of fluctuations in foreign exchange rates and fragmented banking systems. Investments in non-listed companies often require lengthy, paper based manual processes that can delay critical transactions such as changes in share ownership and loans. Blockchain is helping to open new opportunities for trading and investing by simplifying the tracking and management of securities information. It may be a secure, efficient, low cost solution for the registration of stocks and shares of a firm or start up financed by crowed funding. It helps regulators to know about market conditions, and supports regulatory activities such as managing investors and fighting against money laundering.

3. **Healthcare**: Combining the advancements in health care, e.g. genetic research, precision medicine, etc. and advancements in information technology, e.g. producing large databases of health information, would foster transformative change in the field of health information technology. Any blockchain for health care would need to be public and would also need to include technological solutions for scalability, access security and data privacy. A distributed blockchain that contains health records, documents or images would have data storage implications and data throughput limitations. Every member in the distributed network of the health care blockchain would have a copy of every health record of every individual and this would not be practical from a data storage perspective. Because health data is dynamic and expansive, replicating all health records to every member in the network would be bandwidth intensive, wasteful on network resources and pose data throughput concerns. The blockchain would need to function as an access-control manager for health records and data. Transactions in the blocks would contain a user's unique identifier, an encrypted link to the health record and a timestamp for when the transaction was created. To improve data access efficiency, the transaction would contain the type of data contained in the health record and any other metadata that would facilitate frequently used queries. The health blockchain would contain a complete indexed history of all medical dataand would follow an individual user throughout his life. All medical data would be stored off blockchain in a data repository called a data lake. Data lakes are highly scalable and can store a wide variety of data. Data lakes would be valuable tools for health research and analysis. All information stored in the data lake would be encrypted and digitally signed to ensure privacy and authenticity of the information. When a healthcare provider creates a medical record, e.g. prescription, lab test, pathology result, MRI, etc. a digital signature would be created to verify authenticity of the document or image. The health data would be encrypted and sent to the data lake for storage. The user would have full access to this data and control over how his data would be shared. The user would assign a set of access permissions and designate who can query and write data to his blockchain. A mobile dashboard application would allow the user to see who has permission to access blockchain, view an audit log of who accessed his blockchain including when and what data was accessed and to give and revoke access permissions to any individual who

has a unique identifier. Access control policies would also be securely stored on a blockchain and only the user would be allowed to change them. This provides an environment of transparency and allows the user to make all decisions about what data is collected and how the data can be shared. After a health care provider is granted access to user's health information, he queries the blockchain for the user's data and utilizes the digital signature to authenticate the data. This will help with the regulation of the availability and privacy of a patient's health records and reduce fraud.

4. **Education**: The idea of storing educational records in the blockchain has been circulating in the press and academic papers for several years. The key entities of the blockchain platform are students, educators, witness and recruiters. When blockchain is used in education, it has to operate on sensitive data, such as courses, assignments, solutions and grades. The permission less blockchain would require disclosing this data to the public, whereas the permissive ones lack public verifiability. So the architecture splits the blockchain in to two layers: the private layer contains sensitive data, and the public one contains the information necessary to validate the integrity and authenticity of the private blocks. The private layer is maintained by each educator independently of others. Educators can be either large educational institutes, capable of running their own nodes, or some trusted party that runs the chain for the self-employed teachers and small institutions. This layer contains the personalized information on the interactions between the students and the educators. All the interactions, such as receiving an assignment, submitting solutions, or being graded, are treated as transactions in the private chain. Students get access to the platform through web and mobile applications. Using the applications they choose educators, enroll in courses, get assignments and submit solutions. The scores and the criteria of whether the student has finished the course successfully are determined by the educator. Making the educator's chain private opens the possibility for educators to tamper with the data in their chains. To overcome this issue and make the private transactions publicly verifiable, the public layer of the blockchain is introduced. The public part of the network consists of witness – the special entities that witness the fact that a private block was produced by an educator. They do so by writing the authentication information of a private block into the public chain, which is used in the future by an arbitrary verifier to substantiate a proof of transaction inclusion given to it by a student or an educator. The recruiters buy this data from educators using a secure data disclosure protocol for recruitment purposes.

5. **Defense**: Information regarding defense infrastructure like operating system and network firmware is critical to national security. This infrastructure is to be kept safe from unauthorized modifications or access; otherwise it might cause serious compromises to national security. Blockchain technology can be leveraged to provide consensus based access for modifying data and distributing access over multiple system resources such as networks, data centers and hardware equipment to prevent unauthorized access and modification. It also ensures all time security for attacks that can happen in important networks. Cyber defense is the most near term, low cost, high payoff application of blockchain technology. Cyber security relies on secrets and trust. Blockchain preserves truths in two ways. First, they ensure digital events are widely witnessed by transmitting them to other nodes on the blockchain network. Second, using consensus, those events are secured in a database that can never be altered by a single adversary. Using blockchain, the configurations of every component in the system can be imaged, hashed, secured in the database, and continually monitored to protect the system from malware attacks. Any unscheduled change to any configuration, no matter how small, can be detected almost instantly. Blockchain offers aerospace and defense, an industry with multiple participants, an intriguing value proposition to augment existing technology investments. It facilitates accurate, auditable, highly secured record keeping across a group of dispersed investors of aerospace and defense companies. The NATO Communications and Information Agency is currently evaluating proposals in areas of application of blockchain technology relating to military logistics, procurement and finance, internet of things, and other applications of interest to military. The day is not far when applications of blockchain by modern military will

percolate down to civil applications and to the common man.

6. **Energy**: Blockchain technology can be developed to create a transparent, hassle-free and efficient energy marketplace for electric power supply. Micro generation in electricity has started to gain popularity within the power world. Solar power and homepower generation have started to close the power supply gaps. The more microgeneration grows; it will start to create an energy market. Smart meters will be able to register consumed and produced electricity in a blockchain. This will make it possible for people to use surplus energy in different places. It can also be used to encourage the usage of green energy. Blockchain has attracted huge attention and is now being actively pursued in the energy sector. It records and verifies transactions through public ledger. It secures data and the data is available to public (permission less) or private (with permission). Transparency is guaranteed for all transactions, allowing settlement speeds close to real time and building the basis for traceability and trust between actors. Trust is created through a shared reading of the blockchain, reducing the number of intermediaries. A lower number of intermediaries reduces the cost of compliance, reconciliation and transaction, allowing the creation of marketplace with lower entry barriers, enabling the trading of smaller quantities. Efficiency gains through blockchain reduce costs. Control and security can be provided inherently through the blockchain design. Micro-grids are aggregated to a Virtual Power Plants (VPP), which refers to clusters of electricity generators, loads and storage systems that are pooled in an intelligent manner and controlled jointly. Blockchain technology has the potential to make the organization and management of VPPs more efficient.

7. **Real Estate**: Land is the costliest asset in real estate. Most of the disputes, crimes and frauds originate from land. The traditional real estate market is not known for being quick and easy. Land deeds and titling provide a vital protection for buyers and serve as a basis for investment. Blockchain helps in providing a reliable, secured and non-corruptible land record, and validating changes to the status of land record across owners. Presently, many countries are making experiments with blockchain to digitize their land records and get rid of middlemen. Since there is no global standard or public ledger where all the data is registered, currently, most buyers and sellers make use escrow and title companies for third party verification for safety as well as to reduce the risk of fraud. This third party verification involves additional cost and time. But, by using a blockchain distributed database to prove authenticity, property owners could legally transfer ownership immediately without paying for third party verification. The speed to transact will be shortened from days/weeks/months to minutes or seconds. Blockchain enables near real time settlement of recorded transaction, removing friction and reducing risk, but also limiting ability to change back or cancel transactions. It is based on cryptographic proof, allowing any two parties to transact directly with each other without the need for trusted third party. It contains a certain and verifiable record of every transaction ever made, which mitigates the risk of double spending, fraud, abuse, and manipulation of transactions. Trusted intermediaries in the real estate, such as notaries, can be terminated through blockchain, as transactions can be independently verified and automatically reconciled. Blockchain can link land titling, land registry and the record of rights, and provide a buyer the historical ownership details through peer to peer distributed network. It can make due diligence in property transaction possible at the touch of a button.

8. **Digital Identity**: Internet confers several identity challenges in the area of security, privacy and usability. In the real world imperfect system for establishing personal identity exists in the form of identity document, driver's licenses and even passports. There is no equivalent system for securing either online authentication of our personal identities or the identity of digital entities. So while governments can initiate physical identification, online identities and digital entities do not recognize national boundaries and digital identity authentication appears a difficult problem without an overseeing global entity. To get rid of this problem, the requirement for blockchain based digital identity is remarkably noticeable in the internet age that may offer a way to circumvent this problem by delivering a secure solution without the need for a trusted central authority. It can be used for creating an identity on

the blockchain, making it easier to manage for individuals giving them greater control over who has their personal information and how they access it. By combining the decentralized blockchain principle with identity verification, a digital identity can be created that would act as a digital watermark which can be assigned to every online transaction. The solution can help the organizations to check the identity on every transaction in real time, hence, eliminating rate of fraud. Consumers will be able to login and verify payments by simply using an app without having to enter any of the traditional username and password information. The solution will store their encrypted identity, allowing them to share their data with companies and manage it on their own terms. Blockchain would think about a world where we don't have to worry about ever getting our identity stolen. Blockchain technology makes tracking secure and efficient. Sign-ins are seamless, easier, and bring down fraud. This can help with national security, healthcare, banking, online retailing, and citizenship documentation. Blockchain identity technology can be used for passport, IDs, E-Residency, Online account logins, wedding certificates, birth certificates, digital identities, etc.

9. **Digital Voting**: In a democratic country voting is choosing the deserving candidate in majority. The most common way of voting is through a paper based system, but it has many disadvantages like consuming huge time, security of people in question, stealing, etc. which makes the advantages of digital voting. Digital voting is the use of electronic device such as voting machines or an internet browser to cast vote. Digital voting may also referred as e-voting, when voting done using machine in a polling station and i-voting, when voting done using a web browser. Digital voting also has some disadvantages like security of data, potential attacks, etc. One way to solve these security credentials problems through the blockchain technology. The voter downloads and installs the voting booth then securely submits identity information for verification with register for the election they qualify to vote in. Now the voter has been authorized to cast a ballot by both the identity verifier and registrar. The voter then votes and submits their ballot to a secure blockchain based ballot box, while retaining anonymity and ballot secrecy. Using their vote account, the voter can go into the ballot box and verify for themselves that their vote was casted as intended. The voter can even audit each ballot and the ballot box to confirm the election results are accurate. If a voter changes their minds, they have the ability to change their vote at any time in the days leading up to the election. A big problem with putting the electoral online is because of security. By using blockchain, a voter can check to make sure their vote went through successfully. The whole process is kept anonymous from everybody else. If distributed digital voting could be implemented, more people who have not voted in years might actually get back out there and vote.

10. **Legal services**: Legal contracts are still written, with physical signatures required on original documents, which requires significant time to accomplish, all for a binding legal agreement. The blockchain holds the promise to change this into a digital process by using smart contract. These smart contracts could potentially be created and executed directly between the relevant parties, with less lawyer involvement. The law has struggled when it comes to protecting intellectual property in the digital age, including images, audio, and video files, as well as designs and symbols. Artists and musicians attempt to protect their work, but too often it gets used without their permission, and royalties do not get paid from audio streaming services that struggle with profitability. Companies promise to have a platform for registering intellectual property and anchoring it to the blockchain. A property right encompasses how property is bought, sold and rented. The blockchain with its inherent security and digital ledger function promises to be an effective, secure and immutable method to store the data essential for property rights, including land ownership, and the details of when it changed hands. Currently, notary publics are used to confirm and verify signatures on legal documents, such as deeds and contracts. Using blockchain technology, these documents can be preserved digitally as part of a digital ledger. The blockchain is ideally suited for application of digital ledger in the chain of custody, a paper trial that gets created for each piece of evidence, and must be fully maintained until this gets presented in court.

11. **Supply chain management**: Supply chain is defined as the line of various points involved in

producing and delivering goods, from the procurement stage to the end customer. Nowadays, the supply chain can consist of various stages and locations. Consequently, it has become more difficult to trace events in the entire chain. Moreover, due to lack of transparency in the supply chain, buyers and customers cannot be sure in true value of the products or services. It is hard to investigate the accountability of illegal events associated with the supply chain. Blockchain, as an insurer of transparency and security, can be a good solution for fixing supply chains. Even the simplest application of the blockchain technology could bring the supply chain great benefits. Registering the transfer of products on the digital ledger as transactions allows identifying the main data relevant to manage the supply chain. Public availability feature of blockchain gives the opportunity to track products from the place of origin, packaging and way of transportation to the end customer which consequently increasing their trust to the company. Decentralized structure of blockchain gives the ability for participation for all parties in the supply chain. Cryptography based and immutable nature gives the assurance of security. As all payments or payables can be uploaded in the digital ledger, it will be easily checked and verified. So, errors in auditing and payment processing are reduced. It decreases the probability of any kind of fraud. Real-time feedback from customers helps various parties across the supply chain to analyze their work and to avoid several errors.

12. **Telecommunication**: Blockchain provides connectivity platform to enable new generation of access technology selection management, required for the realization of 5G network potential. It also provides eSIM solution and authentication services based on cryptographic identity, enabling new revenue streams for Communication Service Providers (CSPs). Telecom companies implement blockchain for data and value exchange within and between networks to reduce subscription identity and roaming fraud. CSPs have traditionally owned the end to end telecoms value chain for both consumers and businesses – spanning network infrastructure, provision of core voice and data connectivity, and related consumer services. However, tough competition in digital world, together with decreasing revenues from voice and increasing costs due to the high bandwidth demands, there is a need to reduce costs and find new sources of revenue. Blockchain has the potential to be for 'value' what the internet has been for 'information'. Blockchain can be implemented for data and value exchange within and between networks to reduce fraud, losses due to fraud and costs for fraud detection applications. It is a common platform to provide seamless connectivity. The IoT is a concept where about every appliance or device would be able to connect online so that they could easily update information about each other or get updates, etc. The IoT applications on the blockchain will process everything from the maintenance of mechanical aspects to the analysis of data and automated management. This yields efficiency and adequate monitoring. Today, some big names in the telecommunications sector are advocating the consistent use of IoT applications. This is because an automated run of their remote devices will help with their maintenance.

**Challenges to Blockchain Governance:**

- *Difficult to understand and use*: The blockchain is a difficult concept to understand. It is not easy to make people understand what the blockchain is because the available information is not sufficient and what most people understand about blockchain is different from the fundamental concept of blockchain. The system is not very easy to use, if anybody is not computer savvy and does not understand how it works, then he will feel frustrated using the blockchain.

- *Inadequate infrastructure*: Presently a few people is adopting the system because of ignorance. This prevents the system being implemented on a vast scale. If a few hundred people are added to the system no problem occurs. But, if we add hundreds of thousands the system doesn't have enough capacity to handle that much of people in the system.

- *Scaling*: The scaling of existing nascent programs, based on the blockchain, poses many difficulties. For example, carrying out a transaction, using the blockchain as a first time user. One would have to pass through downloading a total set of the currently active blockchains, and then verify before one's first transaction can be processed. That would

take many hours, or even days, depending on the rate at which the number of blocks keep increasing exponentially.

- *The verification process is too long*: Now, the average financial transaction on the blockchain could take 15 minutes to verify. This is no doubt faster than the traditional transfers between banks. It is not at all a problem as long as the transaction is not time-sensitive. But when it comes to things like stock trading, it can become a real issue. In stock trading 15 minutes time can be a lifetime because the price could increase and decrease several times over. For stock traders, the lags in the system at present would be very repellent.

- *Records are permanent, never deleted*: Permanent records can be a good thing and also a bad thing. We must have a permanent record, e.g. deed, for buying a house or land. But whenever we defaulted in repayment of bank loan, house got repossessed. If we repay the debt we can get rid of repossession but records making us defaulter would be there forever. Every creditor that viewed our credit history would be able to see it. This could affect our chances of getting credit in future, and it could have a negative influence when it comes to the cost of credit granted to us. Having a permanent record, in this case, is not a positive thing.

- *There are legalities that must be addressed*: The laws will need to be changed to discuss legal issues that might crop up, especially as far as the transfer of assets, property ownership and online contracts is concerned. There is also the question of how well the system will be regulated because there are some notorious people who use the technology for illegal transactions such as human trafficking, murders for hire, terrorism, etc. The anonymity of the system could be detrimental in this case. How do we legally determine who is committing the crime here?

- *Cyber security*: Even though there are private and strongly encrypted blockchains, still blockchain has a lot of cyber security problems that will need to be taken care of before everybody is going to be willing to trust them with their personal details.

- *High initial investment*: Even though blockchain technology can offer a lot of savings in time and cost, it requires a high initial capital outlay that will often discourage some users.

- *Lack of privacy*: Transparency, which is typically seen as something good, may not be a plus for everybody. Blockchain transparency allows everybody to see your transactions, as well as everybody else's.

- *Large energy consumption*: Users will use lot of computing power when they perform transactions. When it comes to Bitcoinblockchain, network mines are working to perform 450 thousand trillion solutions in each second.

- *Fewer jobs due to automation of the system*: One concern that has been noted is that businesses will be able to reduce their staff because of this technology. In the preliminary stages there may be chances of losing jobs. However, the blockchain itself can help to create jobs and stimulate the economy. At this stage in time, we cannot merely say that it is going to lose too many jobs. Who knows what we will come up with in future?

- *Quantum computing*: The core idea of blockchain technology is its reliability because it is not possible for just one user to exclusively gain access to the system due to an insufficient availability of the needed computing power. However, the possibilities of illegal use of blockchain technology and hacking distributed networks may be a feasibility at a future date especially when quantum computing matures.

- *There is no general administrator*: Though this is good for the autonomy of a system but can hinder its overall development. Without unified vision of what steps to be taken to move forward, nobody will pursue blockchain. Different people have different opinions on how to move forward with blockchain and they cannot seem to agree. So some general direction is necessary to make sure that blockchain apps are sustainable, to get new people to join and to get the current members to stay on board. This has already been seen to affect blockchin.

- *Bootstrapping*: The shift of business documents, frameworks, and existing contracts to the new blockchain based methodology will pose the large task of migrating activities. For example, in the case of Real Estate property ownership, the existing

papers which lie in escrow or country organizations would have to be migrated to the corresponding blockchain structure. This could be costly and time consuming.

**Conclusion:**

The potential of blockchain technology is enormous and it can make a critical contribution to fight against corruption, strengthen integrity in the public sector and restore trust in government, but we must be mindful of its requirements and limitations. Blockchain technology will not solve all government problems because there are so many barriers in its adoption. Before deploying blockchain, it is important that governments must conduct a feasibility study of blockchain-based solutions, and the value these can add. Regulatory uncertainty is an important consideration while deciding whether to use blockchain. The reliability of records, especially for the first entries, is critical for the successful implementation of blockchain in government. In 2016, blockchain was first time adopted in India primarily among the players in the Banking and Financial Services industry. But with the beginning of 2017, India has seen blockchain adoption increasing amongst government bodies. A lot of Indian players have tested usage of blockchain in the areas of Trade Finance, Cross-border Payments, Bill Discounting, Supply Chain Financing, Loyalty and Digital Identity areas. In March, 2018, NITI Aayog emphasized a number of areas, e.g. land records management, supply chain management including PDS and pharmaceutical supplies, electronic health records and healthcare, in which the government can use Blockchain Technology and take the lead over private players. Blockchain can also be used to maintain a comprehensive and verifiable database of educational qualification certificates issued by the country, thus eliminating the problem of fake degrees. Andhra Pradesh is a state where the first land titling systems will be ready by the end of 2019. Blockchain technology is not the panacea or not a magic stick, however, it is still in its early days and governance models are still under development. The requirements and implications of blockchain in the public sector, however, are yet to be fully understood. It will take several years to go from pilot programs to broader, government-wide applications. Blockchain will bring a new technological paradigm provided governments capitalize this technology and get support from its stakeholders.

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# Industry Focus - Road Infrastructure Industry

**Introduction**

India has the one of largest road network across the world, spanning over a total of 5.5 million km. This road network transports 64.5 per cent of all goods in the country and 90 per cent of India's total passenger traffic uses road network to commute. Road transportation has gradually increased over the years with the improvement in connectivity between cities, towns and villages in the country.

The Indian roads carry almost 90 per cent of the country's passenger traffic. In India sales of automobiles and movement of freight by roads is growing at a rapid rate.

**Market size**

The construction of highways reached 9,829 km during FY18 which was constructed at an average of 26.93 km per day. The Government of India has set a target for construction of 10,000 km national highway in FY19. During April-June 2018 a total of length of 2,345 km of national highways was constructed.

Total length of roads constructed under Prime Minister's Gram Sadak Yojana (PMGSY) was 47,447 km in 2017-18.

**Key Investments/Developments**

The Union Minister of State for Road, Transport and Shipping has stated that the Government aims to boost corporate investment in roads and shipping sector, along with introducing business-friendly strategies that will balance profitability with effective project execution. According to data released by the Department of Industrial Policy and Promotion (DIPP), construction development including Townships, housing, built-up infrastructure and construction-development projects attracted Foreign Direct Investment (FDI) worth US$ 24.87 billion between April 2000 and June 2018.

Some of the key investments and developments in the Indian roads sector are as follows:

- A total of 892 km and 2,345 km national highway projects were awarded and constructed, respectively between April - August 2018.
- The first phase of construction work of Mumbai's 29.2 km long coastal road is expected to begin in May 2018, after bids are finalised in March.

**Government Initiatives**

Some of the recent government initiatives are as follows:

- As of October 2018, total length of projects awarded was 6,400 kms under Bharatmala Pariyojana (including residual NHDP works).
- As of August 2018, a total length of 34,800 km road projects have been proposed to be constructed, under Bharatmala Pariyojana Phase-I.
- As of August 2018, Government of India has approved highway projects worth Rs 2 billion (US$ 29.83 million) to improve connectivity among Gujarat, Maharashtra, Rajasthan, Madhya Pradesh and Diu.

**Achievements**

Following are the achievements of the government in the past four years:

- The total national highways length increased to 122,434 kms in FY18 from 92,851 kms in Fy14.
- The length of national highways awarded increased to 51,073 kms between FY15-FY18 from 25,158 kms in FY11-FY14.
- The construction of national highways increased to 28,531 kms between FY15-FY18 from 16,505 kms between FY11-FY14.
- The construction of national highway per day increased to 26.9 kms per day in FY18 from 11.6 kms per day in Fy14.

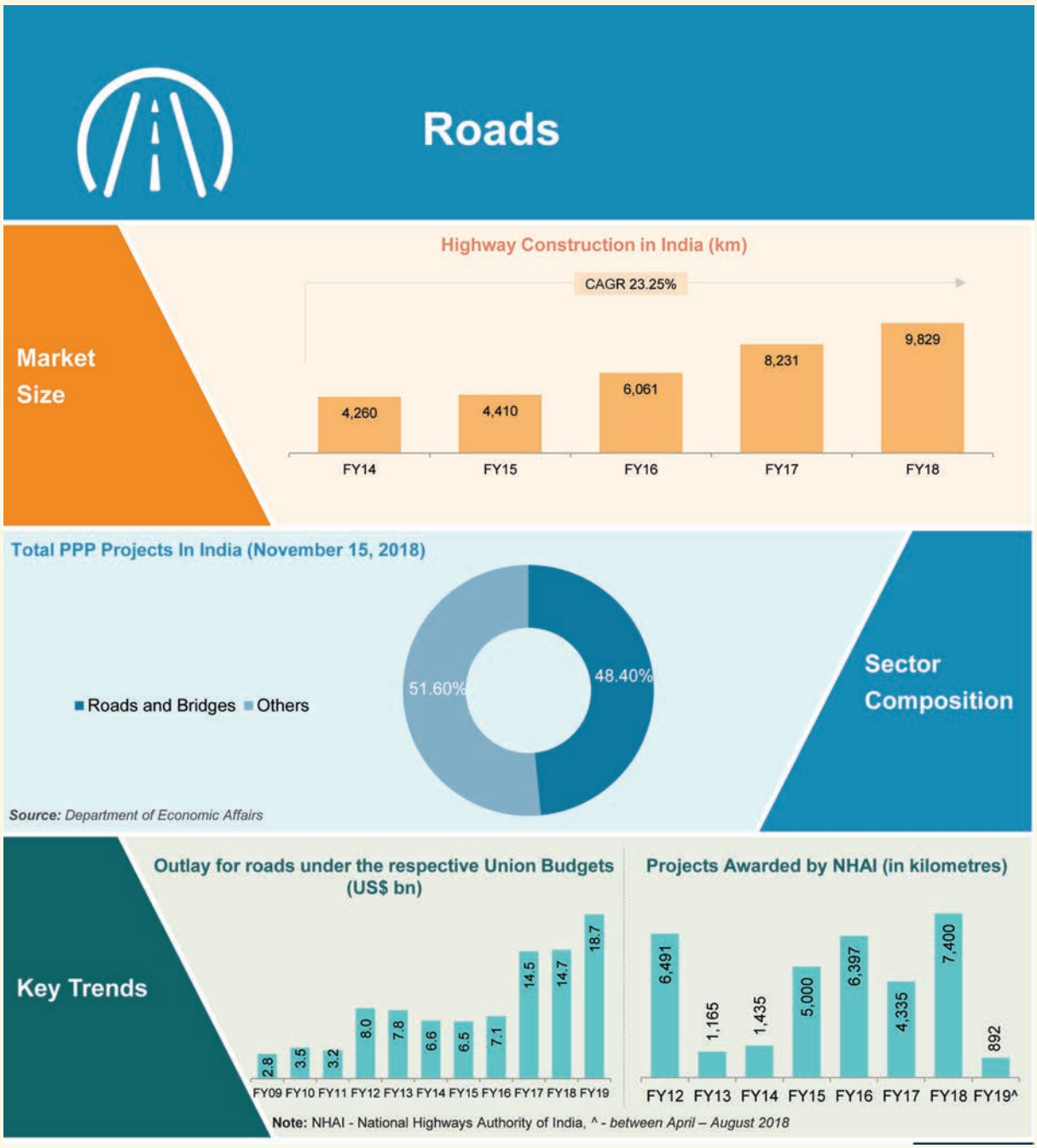
**Road Ahead**

The government, through a series of initiatives, is working on policies to attract significant investor interest. A total of 200,000 km national highways are expected to be completed by 2022.

The Ministry of Road Transport and Highways has fixed an overall target to award 15,000 km projects and construction of 10,000 km national highways in FY19. A total of about 295 major projects including bridges and roads are expected to be completed during the same period.

Exchange Rate Used: INR 1 = US$ 0.0142 as on Q2 FY19.

***References:*** Media Reports, Press Releases, Ministry of Road Transport and Highways, NHAI website, IBEF, Press Information Bureau (PIB).



# Industry Focus - Metals & Mining Industry in India

**Introduction**

India holds a fair advantage in cost of production and conversion costs in steel and alumina. Its strategic location enables convenient exports to develop as well as the fast-developing Asian markets.

India produces 95 minerals - 4 fuel-related minerals, 10 metallic minerals, 23 non-metallic minerals, 3 atomic minerals and 55 minor minerals (including building and other minerals).

Rise in infrastructure development and automotive production are driving growth in the sector. Power and cement industries are also aiding growth in the metals and mining sector. Demand for iron and steel is set to continue, given the strong growth expectations for the residential and commercial building industry.

**Market Size**

India is the 3rd largest producer of coal. Coal production stood at 676.51 million tonnes in FY18. India has the 5th largest estimated coal reserves in the world, standing at 319.02 billion tonnes in Fy18.

India ranks 4th in terms of iron ore production globally. In FY18, production of iron ore stood at 210 million tonnes. India has around 8 per cent of world's deposits of iron ore.

India stood as the third largest crude steel producer with output of 101.4 million tonnes in 2017. Crude steel production in the country rose to 102.34 million tonnes in Fy18.

According to Ministry of Mines, India has the 7th largest bauxite reserves- around 2,908.85 million tonnes in FY17. Aluminium production stood at 1.60 million metric tonnes during Apr-Sept 2017 and is forecasted to grow to 3.33 million tonnes in Fy20.

**Investments/ Developments**

- Cumulative FDI inflows into the metals and mining sector between April 2000 and June 2018 stood at US$ 14.33 billion as per Department of Industrial Policy and Promotion (DIPP).
- Under the Mines and Minerals (Development and Regulation) Act of 1957, FDI upto 100% under Automatic route is allowed for the mining and exploration of metal and non- metal ores including diamond, gold, silver and precious ores, while FDI upto 100% under Government route is allowed in for mining and mineral separation of titanium bearing minerals and its ores.
- The Government of India is taking steps boost the country's domestic steel sector and raise its capacity to 300 million tonnes (MT) by 2030-31.

**Government Initiatives**

- FDI caps in the mining and exploration of metal and non-metal ores have been increased to 100 per cent under the automatic route.
- In July 2018, Union Minister of Coal, Railways, Finance & Corporate Affairs launched a mobile application 'Khan Prahari' and Coal Mine Surveillance & Management System (CMSMS) developed by Central Mine Planning and Design Institute (CMPDI).

**Achievements**

Following are the achievements of the government in the past year:

- 33 blocks of major minerals were successfully allocated in 2017.
- The Multi-sensor Aero-geophysical Survey of the obvious geological potential area was inaugurated on April 07, 2017.
- Mining Surveillance System (MSS) was launched on January 24, 2017. It aims to curb illegal mining activity through automatic remote sensing detection technology.

**Road Ahead**

There is significant scope for new mining capacities in iron ore, bauxite and coal and considerable opportunities for future discoveries of sub- surface deposits.

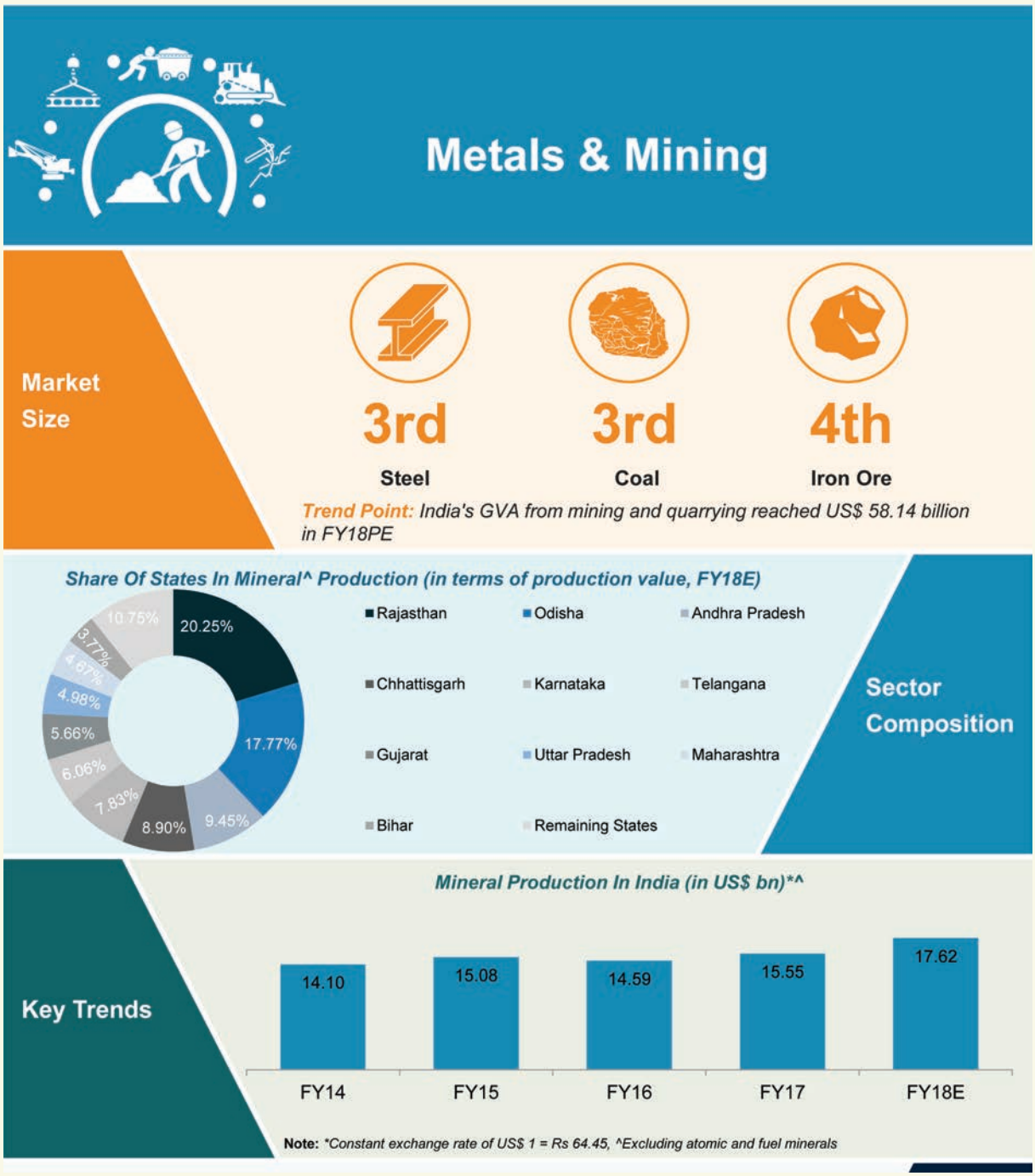
Infrastructure projects continue to provide lucrative business opportunities for steel, zinc and aluminium

producers. Aluminium production is forecasted to grow to 3.33 million metric tonnes by Fy20.

Iron and steel make up a core component of the real estate sector. Demand for these metals is set to continue given strong growth expectations for the residential and commercial building industry.

Exchange Rate Used: INR 1 = US$ 0.0142 as of Q2 Fy19

***References***: Media Reports, Press Information Bureau (PIB), IBEF, Union Budget 2017-18



# ECONOMY UPDATES

**Responsible Energy Pricing is need of the hour: PM Modi**

Energy justice for India is also a key objective and priority for the government, Modi said and added that the government had developed and implemented policies whose results were evident.

Highlighting that the world was entering an era of greater energy availability, Modi added that more than 1 billion people in the world still did not have access to electricity and more than 1 billion did not have access to clean cooking fuel. The prime minister added that there were signs of convergence between cheaper renewable energy, technology and digital applications which could expedite attainment of sustainable development goals.

**Co-living market potential to grow rapidly**

Co-living space meant for students are generally equipped with basic facilities such as housekeeping, laundry services, security and meals, apart from additional facilities such as gaming consoles, libraries, gyms, pools and high-speed Wi-Fi.

As per its survey, total occupancy recorded in hostels within college campuses across India was only 3.4 million students, leading to a demand-supply mismatch of 8.9 million students. This deficit for co-living spaces is currently being met by the unorganised sector, which includes PG accommodation and rental houses, etc. On the current status, PropTiger said that entrepreneurs are launching co-living portals and tying-up with real estate developers to build project specifically meant for the co-living segment, especially for students and working professional.

**Total deposits in Jan Dhan accounts set to cross Rs 90,000 crore**

Total deposits in Jan Dhan accounts are set to cross Rs 90,000 crore with the government making the flagship financial inclusion programme more attractive especially by doubling accident insurance cover to Rs 2 lakh. According to data from the finance ministry, the deposits, which have been steadily rising since March 2017, have already reached Rs 89,257.57 crore as on January 30, and are steadily rising.

**Thermal power projects with investments worth Rs 2.5 lakh cr facing stress**

The ASSOCHAM-Grant Thornton joint study noted that the country's power sector has been one of the highly stressed sectors in recent times, with loans worth approximately Rs 1 lakh crore having turned bad or been recast. Non-availability of regular fuel supply arrangements, lack of Power Purchase Agreements (PPAs), inability of promoters to invest equity and working capital, and regulatory and contractual issues are some of the major challenges faced by thermal power projects, it said.

The report added that there is no universal solution for these ailing power assets and a mixed multi-pronged strategy needs to be adopted instead of a straight jacketed approach. Further, an effective resolution in a time-bound manner is warranted by improving the macro environment governing the power sector, it said.

**India unlikely to achieve 100 GW solar power target of 2022**

India is unlikely to achieve its target of 100 gigawatt (GW) solar electricity capacity as it faces short-term uncertainty due to imposition of various taxes, research and consultancy firm Wood Mackenzie said. India's installed grid-connected power generation capacity increased 4 per cent from January to October 2018 to reach 347 GW. Renewables accounted for 9.7 GW of the total increase of 13 GW, highlighting the significant investment flowing into the sector, it said in a note adding

**SoftBank led energy leads enthusiastic bidding in wind power auction**

SoftBankled SB Energy has made its first pitch for a wind tender in India, bidding for half the 1,200 MW offered in a central government auction that has attracted many bids despite the industry's worries about land availability and transmission infrastructure.

ReNew Power, Italy-based Enel Power, and France's EDF bid for 300-MW capacity each, while Adani Green Energy and France's Engie bid for 250 MW each in the tender for which techno-commercial bids were due to be submitted on Tuesday.

**Auditors barred from putting a value on companies they are auditing**

An income tax tribunal has barred auditors from issuing valuation certificates to the companies they are auditing. This is set to impact several tax disputes around valuations in companies including angel tax disputes involving start-ups.

The Bangalore Income Tax Appellate Tribunal (ITAT) said that auditors of a company cannot double up as accountants especially in situations while dealing with "share valuation for the purpose of excess share-premium taxability." Many accountants and valuers are already facing heat from the tax department. ET had, on December 25, reported that the tax department has started issuing show-cause notices to valuation experts, questioning the premiums several startups fetched during their investments rounds.

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