

ABCD of Technology for Accountants



Technology advancement, especially information technology, has changed the working of traditional accountants in the last few years. Dynamic changes have been observed in the process of Compliance & Regulatory audit, Bank audit, ROC filling, Fraud detection & Forensics, Accounting, Financial management, Taxation, Book keeping & Payments due to transformation of these processes on information technologies. Rapid advancement of technology is forcing accountants to either change their self with advancement of the technology to become fast, efficient, reliable and customer delight, or go into silos losing efficiency compared to peers, slow, unreliable and unmatched customer requirements.

Slowly but firmly all accountants are learning these advance technologies to stay relevant in this competitive market and perform as per their customer requirement. Presently bouquets of technologies are available for the accounts professionals. This article discusses the technologies like Artificial Intelligence, Blockchain, Cyber Security and Data Analytics which are famously known as ABCD of technology. This article shall explore what these ABCD technologies are and how would these help accountancy professionals in their day to day work and how they can reap the benefit from it.



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Need of Technology in Accountancy

Business organisations are no more static organisations and rather they are now dynamic, vibrant and customer oriented. To compete in the market, these dynamic organisations put their steps in such a way that fast, reliable and efficient results may be obtained using optimum resources in less time.

Accounting professionals are connected to these organisations either working in these dynamic organisations or performing audit of the same. To perform efficiently, accounts professionals need to adopt the technology used by these dynamic organisations in quick session.

Every accounting professional who either works as an auditor or auditee, need to understand that their job is risk based and compliance oriented. This type of job can be done without technology but it would be time consuming, repetitive, erroneous and on papers. Accountants must use advance technologies which are available to be used to satisfy the following.

1. **Timeliness:** Accountant must use the technology for the fast way of doing the things to compete in the market from the peers. Generally the customer of the accountants gets the deadlines from the Government or regulators to submit the compliance report on time. Accountant can channelize the usage of the technology to finish the job on time.
2. **Reliable:** Accounting information should be reliable and dependable with complete material accuracy. The users want that an independent and non-human process like technology should do the needful to achieve reliability. Accountant must use technology to provide reliable information to respective stakeholders.
3. **Efficient:** An efficient accounting process generally produces high results output compared to low input in terms of resources. To compete in the market, organisations usually look forward to their accounting professionals' efficient accounting processes. Accountant must use technology to make the process efficient and productive.
4. **Confidentiality:** The accountant is obligated to protect certain information from unauthorised disclosure or public release. Accountant must know that certain technologies are available to protect the desired information from unauthorised disclosure. Accountant must use technology to protect the information from unauthorised disclosure.
5. **Integrity:** Accountants are well aware that information must have certain qualities like completeness, unbroken, unimpaired and sound because of the significance of it to those who rely on it. Technology provides various methods to the accountant to provide integrity to the information and assure intended users for accurate information they are dealing with.
6. **Authenticity:** The authenticity of the accounting information specifically reflects the essential connotation of the financial information. Authenticity is assurance that a message, transaction or other accounting information has been exchanged from the source it claims to be from. Technology provides the proof of identity or authenticity among accountants, clients, statutory and regulatory bodies.
7. **Availability:** Availability of the information at desired location, to desired person at desired time is a must for timeliness and legitimate process of the accounting information. Accountants always want the information at desired time to process the clients' information. Technology has provided enough tools and techniques to the accountants for the information availability.
8. **Competing Market:** Today every professional is not only competing in the market but also matching with the profile of their dynamic & vibrant customer organisations. Accountant now-a-days require to match their self with customer's technology and need to be one step ahead in terms of usage of new technologies. When accountants match with the customer pace, they stay relevant and proficient in the market.

ABCD of Technology

In this twenty first century fast and high volume of convergence of different profession's processes on the information technologies has been observed. Plethora of technologies are now being used by the professionals, and the technologies which are prevailing, compelling and creating niche for the accountants are Artificial Intelligence (A), Blockchain (B), Cyber Security (C) and Data Analytics (D). We will discuss these major technologies from accountants' perspective.

A. Artificial Intelligence

Artificial Intelligence is a technology that enables computers to perform decision based tasks previously left to humans. It shows up in multiple

Technology

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forms, including machine based learning that can progressively become better at analysis and decisions the more it is used.

Intelligence is intangible and composed of Reasoning, Learning, Problem Solving, Perception, and Linguistic Intelligence. Artificial Intelligence (AI) is a way of making a computer based system, or software perform intelligently, in the similar manner as the intelligent human thinks.

The goals of Artificial Intelligence are to create -

Expert System- The systems which exhibit intelligent behaviour, learn, demonstrate, explain, and advise its users.

To implement Human Intelligence in Machines- Developing systems that understand, think, learn and behave like humans.

Artificial Intelligence technique is a manner to organise and use knowledge efficiently in such a way that-

- (i) It should be perceivable by the people
- (ii) It should be easily modifiable to correct errors
- (iii) It should be useful in many situations.

So, Artificial Intelligence techniques elevate the speed of execution of the complex program it is equipped with. Various types of applications in which Artificial Intelligence is being used include Gaming, Natural Language Processing, Expert Systems, Vision Systems, Speech Recognition, Hand writing recognition and intelligent robotics.

Artificial Intelligence system is now being also used by many accounting firms and it is expected that in couple of years from now they will change the gears in the profession. Artificial Intelligence in accounting is being used to digest and analyse large volumes of data at speeds well beyond what any person or team of people could do.

Accounting firm's auditors can access Artificial Intelligence tools with natural language processing capabilities to interpret thousands of contracts or

deeds. The Artificial Intelligence technology can extract key terms and compile and analyse the information to perform risk assessments or other functions.

Fraud Investigator can use Artificial Intelligence in detecting the fraud. While statistical & data analysis is used to detect fraud passively, artificial intelligence detects fraud actively and directly besides improving speed of processing. Banks can, therefore, approve transactions faster. Artificial intelligence techniques which are used for fraud management generally includes -

1 Data Mining: Data mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics and database systems. So, data mining is to classify, cluster and segment the data and also automatically find associations and rules in the data which may point towards interesting patterns of fraud.

2 Expert System: Knowledge base Expert System is used to develop software that store all the human expertise (after being input by the human expert himself) and then using stored human intelligence to detect fraud.

3 Machine Learning & Pattern Recognition: Machine learning is closely related to computational statistics which also focuses on prediction making through the use of information technologies. Machine learning can also be unsupervised and be used to learn and establish baseline behavioural profiles for various entities and further used to find meaningful anomalies related to fraud or any other transactions.

4 Neural Networks: Neural network based fraud detection is totally based on the human brain working principal. Neural network technology has made a computer system capable of reasoning. The inherent nature of neural networks includes the ability to learn and ability to capture and represent complex input/output relationships.

So, with the help of data mining, expert system, machine learning and Neural networks an accountant can perform various real time works like data analysis, contract & deed interpretation, and fraud detection and investigation.

B. Blockchain

Historically in the year 2008, the Blockchain was

conceptualised by Satoshi Nakamoto. Blockchain is the concept of the asset and records which are immutable, decentralised, having global reach beyond the geographical boundaries.

One can define the Blockchain as “a consensus based secure decentralised public/private database which store information immutably over peer-to-peer network.”

Properties of the Blockchain

Properties of the Blockchain are as follows -

- (i) Blockchain is a chain of Blocks stored in hundreds or thousands of blocks irrespective of geographical location.
- (ii) First block of the Blockchain is called Genesis block.
- (iii) Addition of the blocks in the Blockchain is done through solving the mathematical puzzle using hash and nonce called proof of work.
- (iv) Blocks are connected to each other via Hashing, Nonce & Digital Signature.
- (v) Blockchain is spread over peer-to-peer network; means no central server or body.
- (vi) Each Block of the Blockchain has complete Ledger of the debit/credit of each digital asset. So Ledger is decentralized in Blockchain.
- (vii) Any transaction done by any block of the concerned Blockchain gets reflected in each block of the Blockchain and then each block can verify the said transaction independently to approve the transaction using consensus algorithm.
- (viii) Any change or tempered block is easily detectable.
- (ix) Blockchain uses toughest public key algorithm called Elliptical Curve Cryptography (ECC) for signature and SHA256 for Hashing.
- (x) Blockchain is not destroyable, even by the developer who developed it.
- (xi) Users are recognised by their private key, not by name.
- (xii) Two types of Blockchain are available i.e. public & private

Public Blockchain—Characteristics of the Public Blockchain are as follows-

- (i) Anyone can add the block to the public

Blockchain. Addition a block in public Blockchain is performed by solving mathematical puzzle called mining.

- (ii) Public Blockchain is computationally expensive to mine and add a block.
- (iii) Miner gets awarded in terms of coins after successfully adding a block.
- (iv) Complex rule for better security and very complex consensus algorithm.
- (v) Computation power is distributed globally.
- (vi) Since Blockchain is public, anyone can read without explicit authorisation.
- (vii) Since Blockchain is public so anyone can write without explicit authorization.
- (viii) Although foundations have started them but there is no ownership of Blockchain.
- (ix) Example of public Blockchain is Ethereum, Bitcoin, Ripple & Wave Blockchain.

Private Blockchain - Characteristics of the Private Blockchain are as follows-

- (i) Ownership of the Blockchain is held by an organisation.
- (ii) Easy and computationally less expensive to add a block.
- (iii) No reward like coins is provided.
- (iv) One authorised node can be the arbitrator for any dispute.
- (v) Simple rule for security and no consensus algorithm.
- (vi) Since Blockchain is private so only authorised node can read transaction data.
- (vii) Since Blockchain is private so only authorized node can write transaction data.

Bitcoin Mining: Bitcoin is an implementation of public Blockchain. It is a crypto currency whose ledger is maintained by the Blockchain publically. Bitcoin is of high value due to huge demand and less supply.

Bitcoin mining is the process of recording the transaction by adding a new block by the miner into the Blockchain through a proof of work by solving a mathematical puzzle. Upon successfully solving the said mathematical puzzle or showing the proof of work miners need to announce the answer to entire Blockchain to get verified by the rest and shall able to add the block to the Blockchain.

Technology

Upon successful addition of their block in the Blockchain, miner gets rewarded by the crypto coin called Bitcoin (if mining on Bitcoin Blockchain). Usually 12.5 Bitcoins are rewarded to the miner.

Mining are of following types –

- Solo Mining: Individual Mining
- Pool Mining: Collective Mining
- CPU based Mining: Central Processing Unit based mining i.e. Server based mining
- GPU based Mining: Graphical Processing Unit based mining, using graphical cards
- FPGA based Mining: Field Programmable Gate Array Mining; a special semiconductor based circuit
- ASIC based Mining: Application specific ICs based mining very costly but powerful server.

Ethereum: Ethereum, like Bitcoin, is also an implementation of public Blockchain. It is also a cryptocurrency whose ledger is maintained by the Blockchain publically. Ethereum is second most popular implementation of Blockchain after Bitcoin.

When miners are mining Ethereum, they would be adding the block by running a smart contract. The node which runs the smart contracts shall be awarded coin i.e. Ethereum coins. Usually 5 Ethereum are awarded to the miner.

Comparison between Bitcoin & Ethereum: Major comparison is as follows-

- (i) Bitcoin and Ethereum are part of distributed public chain.
- (ii) Bitcoin is only holder of value (\$7058 /Bitcoin) while Ethereum is not only holder of value (\$295 /Ethereum) but also allows to execute smart contracts.
- (iii) Ethereum is used to run an application like record keeping, hospital management etc. but Bitcoin cannot provide this utility of running applications.

Smart Contracts: Smart Contract is a term used to describe a software program having well defined instruction set that is capable of facilitating, executing and enforcing the negotiation or performance of an agreement i.e. contact using Blockchain technology.

Smart contract is irreversible and even cannot be

changed by the developer who developed this. The entire process is automated and immutable that can act as a complement, or substitute for legal contracts.

Smart contract works as the software emulates the contact and becomes smart contract. The software instructions are sent out to the other computers via a distributed network of ledger i.e. Blockchain. Smart contract has been used in Real Estate, Governance, Recordkeeping and Crowd funding etc.

Accountants can use the Blockchain technology for smart contracts implementation to their customers.

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C. Cyber Security: Accounting professional is already aware about GRC (Governance Risk &

Accountants may suggest their customers in the field of Supply chain Management sector to implement it in Record management, Supply chain management, Invoice & Receipt verifications, and Vendor payments.

Compliance). Due care & Due diligence is what is expected from the accounting professional in their working as they carry sensitive data.

Here we are listing some threats an accountant may face in using information technology-

Phishing: Perpetrator may send emails to lure users that they have won the Lottery or some money needs to be deposited in his account and the requesting user to provide the details of his bank account.

Device Compromise: Device through which bank customer is operating their account either through online or through mobile usually prone may be compromised by perpetrator for execution of the fraud. Compromise of the Operating system of the smart phone or any other status change like firewall setting etc. may lead to fraud.

Man in the Middle Attack: Perpetrator, in this case, alters the communication between the two legitimate parties and executes the fraud. The legitimate parties think that they are communicating with one another but in real scenario their communication is received and altered by the perpetrator.

Spoofing Attack: In this type of attack, the perpetrator misguides the user by sending fraudulent communications from the fraud sites passing them off as legitimate sites. For example instead of sbionline.com perpetrator may present sbionline.com to the user and force them to enter the credentials in the fraudulent site.

APT Attacks: Advance Persistence Threat is used for the infiltration of credentials of the customers of a bank. Perpetrator generally uses botnets (malicious software) to infect the computers in the bank network for the infiltration of the credentials.

Social Engineering: Perpetrator pertains to be the person which he is not, to get the credentials of the user. Perpetrator uses the emotions and traits of the human like fear, greed, curiosity etc. as his tools to force the user to utter his credentials.

Shoulder Surfing: Shoulder surfing happen when a perpetrator tries to look over other person in hope to see his credentials at the time when the said person was about to place his credentials in the bank portal. Once the perpetrator able to see the credentials he will use the same to divert the money from the user account.

Key Logger: Key logger is surveillance software installed by the perpetrator in such a way that every keystroke by the user (including credentials)

in his computer is captured in an encrypted file. Perpetrator using other means collects this file and figures out the credentials in the long text.

Accountants may use the following to mitigate the cyber threat as mentioned above –

Review of IT policies: Technology is evolving and accounting firms need to update their IT policies to reflect current changes including the security ramifications of BYOD (Bring Your Own Device), E-mail, Internet, social media, Digital Signature, Electronic Content Management (ECM), Encryption, Wi-Fi, External Storage media and the remote login. Accounting firms should review policies annually and remind users of changes.

Cyber Security Training: Accountants must attend cyber security training at least once in a year to know what kind of threat a technology user is facing and what are the necessary controls to mitigate these threats. Financial consulting or CA firms (for the sake of this article we write Accounting firms) must include cyber security training in their policy to show their intent to secure their organisation.

Access Control: Accounting firms must place proper Physical control (like Biometric, CCTV, Guard, and Fencing) and Technical control (like Authentication, Authorisation, Accounting, Encryption & Active directory etc.) for restricted access to the resource only by legitimate users.

Password Control: Accounting firms must enforce hardened password rules requiring all users to change their passwords as per policy with complex passwords or more recently, utilizing pass phrases. These should be a combination of numbers, letters, and special characters that are unique to each application and not numerically derivative of a previous password.

Accounting firms must implement multi-factor authentication tools such as a physical security fob, biometric scan, or more prevalently, an application that would send a passcode to their mobile device to be entered to validate the person signing in which is known as two factor authentication.

Least Privilege: Accounting firms ensure that their employees must be able to access only the information and resources that are necessary for their legitimate purpose defined in the policy. This means that user account created for the employee in the firm may get only those privileges which are essential to perform its intended function.

Sound Secure Systems: Accounting firms ensure that, they must have necessary secure system which includes Next Generation Firewall, Intrusion Prevention System (IPS) / Intrusion Detection System (IDS), Security Information & Event Management (SIEM), Antivirus Server which should be updated regularly and all Desktop Operating System should be updated as and when updates come from the vendor. Proper change management and proper Patch management need to be placed before any augmentation of the change in configuration of the system. Prescribed testing of the security systems need to be performed before implementation.

C. Data Analytics

The volume of data that an accountant has to deal with increases to the levels beyond manual analysis. Firms capture terabytes of data about their customers' interactions & business activity. The challenge of the accountant is to sort, arrange and analyse the data to derive result of it. This is where data analytics comes into picture.

Data Analytics largely involves collecting data from different sources and process it in a way that it becomes available to analysts and finally deliver useful result to the firm.

Vs of Data: The five Vs of Data through which its characteristics can be determined are listed as follows –

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1. **Volume:** Huge amount of data (in terabytes) at rest.
2. **Velocity:** Data in Motion, where response time is very less i.e. millisecond.
3. **Variety:** Data in many forms like structured, unstructured, text, multimedia.
4. **Veracity:** Data in doubt, where uncertainty due to data inconsistency and incompleteness, ambiguities, latency and deception.

5. **Value:** Data into Money, where business models can be associated with the data. High value in terms of monetary gain is expected through business models yield through the data analytics.

Life Cycle of Data Analytics: Life Cycle of Data Analytics can be listed as follows –

- (i) Business Problem Definition
- (ii) Survey
- (iii) Team Building & Resources
- (iv) Data Munging
- (v) Data Storage
- (vi) Exploratory data analysis
- (vii) Preparing Data for Modelling & Assessment
- (viii) Modelling
- (ix) Implementation

Type of Data Analytics: For the usage of accountants data analytics can be divided in four parts which are detailed as follows –

- (i) **Descriptive Analytics:** Descriptive analytics provides insight based on past information. Descriptive analytics is used in report generation, providing basic editor function along with horizontal and vertical analysis of financial statement.
- (ii) **Diagnostic Analytics:** Diagnostic analytics examines the cause of past result. Diagnostic analytics is used in variance analysis and interactive dashboards to examine the causes of past outcomes.
- (iii) **Predictive Analytics:** Predictive analytics assist in understanding the future and provide foresight by identifying pattern in historical

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Accountant can use Data analytics in various forms like for Fraud Detection, Customer Interaction, Risk Management, Financial Management, Internet / Web Search and Logistics Management.

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data. Predictive analytics can be used to predict an accounts receivable balance and collection period for each customer and to develop models with indicators that prevent control failures.

(iv) Prescriptive Analytics: Prescriptive Analytics assist in identifying the best option to choose to achieve the desired outcome through optimisation techniques and machine learning. Prescriptive Analytics is used to identify actions to reduce the collection period of accounts receivable and to optimise the use of payable discounts.

Applications of Data Analytics by an Accountant: Accountant can use Data analytics in various forms like –

- (i) Fraud Detection
- (ii) Customer Interaction
- (iii) Risk Management
- (iv) Financial Management
- (v) Internet / Web Search
- (vi) Logistics Management

Channelizing ABCD technology to accountants:

Channelizing ABCD technology to Accountants in different ways as follows-

(i) Self Study: Accounting professionals have their own growth plan and accordingly they plan their learning and do self-study using books, online study materials.

(ii) On the job training: Since more and more accounting firms are gradually using the technology, the accountants working in these organisations learn as per the job requirements of the organisation.

(iii) Accountant Apex Body Initiatives: Apex body like Institute of Chartered Accountants of India (ICAI) has been taking initiatives to provide training to its member accountants. Digital Accounting and Assurance Board (DAAB) generally updates the skills of its member accountants in the following ways –

1. Conducting Scalable, Employable and Updated Post Qualification Course on Information System Audit (DISA)
2. Conducting Training to Members on Forensic Accounting and Fraud Detection (FAFD)
3. Imparting Hands on Training through Forensic Labs

ABCD of technology is the present and future of the professional accountants. Sooner or later it would reach deeper and deeper into accountancy profession. ABCD of technology shall become more advanced in coming times and would not wait for any professional to catch-up.

4. Evolving firms into thriving digital practice by providing leading technology solutions
5. Research on Emerging Technologies - Artificial Intelligence, Cloud Computing and Robotics
6. Executive Development Program on “Blockchain Technology - Driver of Digital Era”
7. Capacity building in digital ecosystem of stakeholders including banks, PSUs
8. Mentoring of Technology Driven Start-ups by Chartered Accountants
9. Team of Innovators for helping members navigate digital path
10. Digital Competency Maturity Model for upgrading firms in digital landscape
11. Technology Summits for its members pan India to update skills on latest technologies
12. Incubation Centre for Blockchain Technology
13. Webinars on strategies and approach to adopt technology in assurance services
14. Research on embedding the understanding and use of technology in accounting and assurance services
15. Research Paper on “Early Signals on Fraud in Banking Sector”

Conclusion

ABCD of technology is the present and future of the professional accountants. Sooner or later it would reach deeper and deeper into accountancy profession. ABCD of technology shall become more advanced in coming times and would not wait for any professional to catch-up. It must be the self-initiative of the accountants to learn and grow with the help of technology. ■