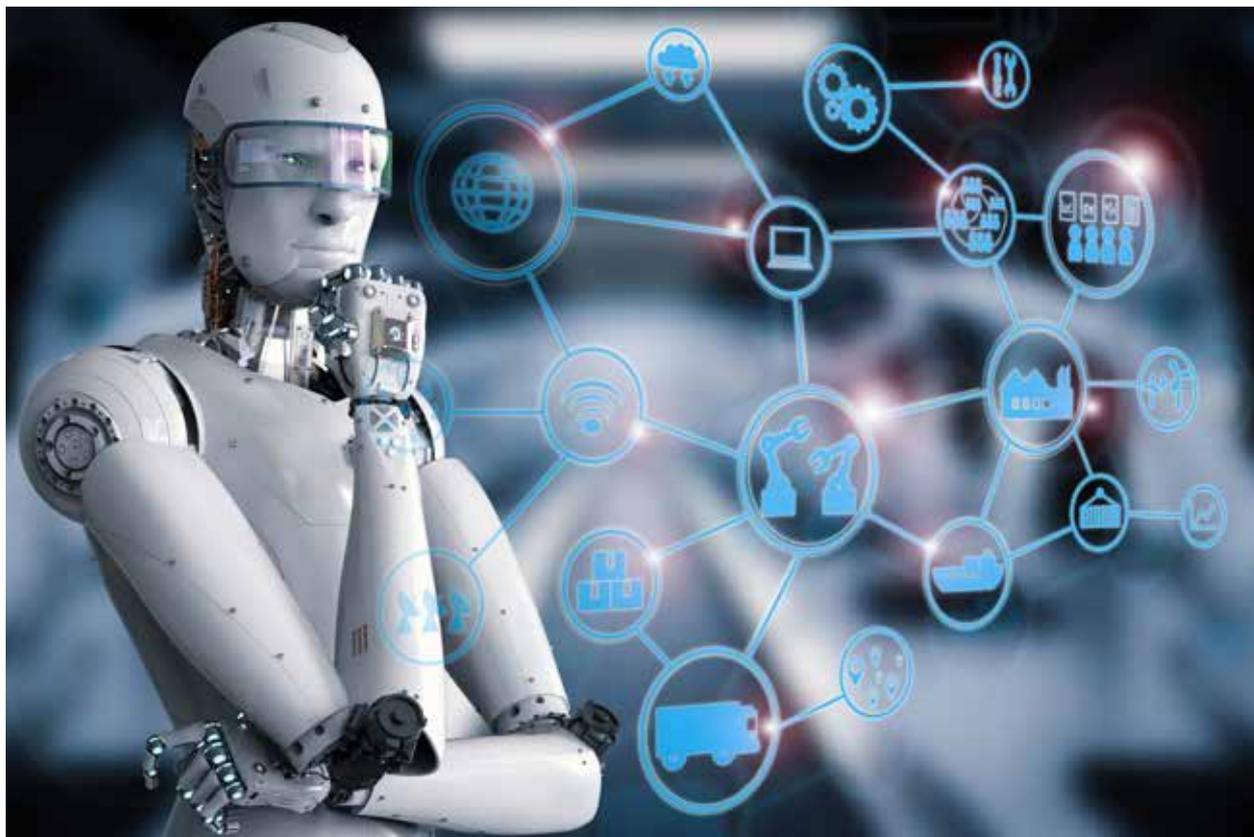


Artificial Intelligence (AI) and Robotic Revolution 4.0— Impact on Accounting and Auditing Professionals



Imagine you are taking the service of a smart robot assistant, sitting beside you in your chamber! She is busy referring to the pages of applicable taxation provisions, relevant judicial pronouncements and case laws to assist you with all possible options in the shortest time span on an intricate international tax matter before you meet the business client! She does not demand any salary. Nor does she get exhausted or feel lazy. Industrial Revolution 4.0 is on! Exponential increase in quantum computing power, big data explosion, powerful algorithms and artificial intelligence make the advent of robotic intrusion in all spheres of human life. Artificial Intelligence(AI) and Robotic Revolution change the way we live, work and enjoy life. Job scenario in the digital ecosystem will have unprecedented challenges and new opportunities to the accounting and auditing professionals. Read on to know more...



K. P. Shashidharan

(The author is a former Director General of the Comptroller & Auditor General of India. He can be reached at kps.ps2013@gmail.com.)

Artificial Intelligence and Robotic Assistant

Google chairman Eric Schmidt described "the age of intelligence" referring to AI and the rise of deep neural networks. Google used a software tool called TensorFlow to build learning systems which can identify faces and objects in photos, respond to

commands spoken into smart phones, and translate into different languages. China's three largest internet companies, Baidu, Tencent, and Alibaba are going to use TensorFlow to help arrive at marketing decisions based on people's preference. In a week long, Chinese Go match, where possible moves are innumerable, conducted between the Chinese grandmaster Ke Jie and AlphaGo, a seminal machine manufactured by Google's DeepMind artificial intelligence lab, having mastered all possible moves of the Go game, defeated the grandmaster. The deep learning revolution is a phenomenon driven by mega US internet companies, and other countries of Europe, Australia and China.

Voice-powered personal assistants like Siri and Alexa, Google's DeepMind learning, IBM's Watson and self driving vehicles perform based on behavioural algorithms and autonomously-powered powerful computer systems. AI can learn on its own from neural networks, improve on past iterations, get smarter, faster and more intelligent. Quantum computing enables machines to solve the most complex problems on environment, ageing, disease, war, poverty or origin of universe.

Impact of AI on Business Operations

A leading Global Institute's research on automation discusses the impact on productivity in the global economy due to application of computer systems based on Artificial Intelligence and robotic science. Automation enables businesses to improve performance by reducing costs, errors and enhancing productivity by improving quality and speed. Automation will impact jobs from miners to bankers, fashion designers, casual workers, and CEOs. It reports that about half of all tasks can be automated with savings of \$15 trillion. Automation makes possible intelligent continuous monitoring round the clock with cognitively-reactive operations with least cost.

The report compares AI with the Industrial Revolution of 18th and 19th centuries, making its disruption of society ten times faster impacting about 3000 times. The Revolution 4.0 or the fourth industrial revolution enables businesses to operate differently with AI, Robotic Workforce, Internet of Things, internetworked physical and cyber-physical systems, nanotechnology, and biotechnology. As smart professionals, the accountants and auditors need to adapt and adopt with the dynamics of the technological landscape, making appropriate

As smart professionals, the accountants and auditors need to adapt and adopt with the dynamics of the technological landscape, making appropriate changes in accounting, auditing, taxation and consultancy practices, procedures, and processes, and reorient and transform as robotic savvy professionals to keep pace with AI revolution 4.0.

changes in accounting, auditing, taxation and consultancy practices, procedures, and processes, and reorient and transform as robotic savvy professionals to keep pace with AI revolution 4.0.

Emerging Challenges and New Opportunities for CAs

The transformed robotic accountants and auditors will find their productivity growing leaps and bounds with XBRL-based structured digital financial reports, innovative adaptations, tools, systems and applications of AI and blockchain-based distributed ledgers. The professional training must undergo change to keep pace with new technologies, adapted practices, procedures, and processes. The computers are there to solve complex taxation issues within split seconds by referring to applicable tax provisions and millions of case laws and judicial pronouncements enhancing the productivity.

The first industrial revolution triggered by the steam engine is followed by the second industrial revolution with oil, electricity, the assembly line production, telephone, phonograph, and internal combustion engine. The third industrial revolution happened when analog electronic and mechanical devices were replaced by digital devices. The fourth industrial revolution aided by AI, IoT, big data tsunami, cyber-physical systems, nanotechnology, cloud computing, biotechnology and robotic assistants, the productivity gains would be immense, when technological innovations are effectively applied. Accountants learning technology can bridge the knowledge gap.

Learning and Specialising for Digital Age Job Changes

Increasing complexity, risks and workload in the digital world with big data can be tackled by using AI and intelligent robots. Estimates show that automation can displace 47 per cent of U.S. jobs

within the next two decades. The top five jobs that are likely to be automated are middle management, commodity salespeople, report writers, journalists, authors, and announcers, accountants and bookkeepers and doctors. Unless and until the accountants, bookkeepers, and auditors gear up for the challenges and fine-tune their skills appropriately, it will cost them dearly. Adaptation is the key. Like automated teller machines (ATMs) significantly reduced the number of bank tellers, reducing the cost of running a bank branch and causing increase in bank branches.

Computers are good at structured problem solving, routine tasks, arithmetic and mathematics while humans are good at unstructured problem solving, non-routine tasks, creativity, innovation, intuition, improvising, exploration, imagination, judgement from incomplete data, politics, identifying and acquiring new relevant information, compassion. 'Human-machine teaming' helps. A team of computers and humans will constitute the new work force to enhance productivity in the digital world. Teaming humans and computers together can leverage.

Human capabilities are augmented by computer capabilities. Robots will take over complex stereotype jobs. Robots need no rest, no pay and do no politics, but can perform only the programmed activities. Humans can focus on client service, innovation, imaginative and creative tasks. Increased productivity from human-robot collaboration can create savings. In the US, it is estimated that 'within the next 5-7 years, as many as 1.1 billion working hours could be freed up in the federal government every year, saving a whopping \$37 billion annually. Ultimately, AI could potentially free up 30 per cent of federal employees' time.' Automation, such as autonomous vehicles, is based on machine-readable rules programmed by software developers. Accounting professionals will be involved in creation and maintenance of the rules. Auditors

understand how the rules are applied and know how to interpret exceptional cases.

Digital General Purpose Financial Report

The financial report is currently getting a face lift as to how information is conveyed. Some of these changes cannot possibly be programmed by computer processes. It is true that XBRL-based structured digital financial reports can be read by machines. XBRL-based financial reports are being submitted to Ministry of Corporate Affairs. The complex logical information in the machine-readable XBRL structured format is not understood by many accountants. There is need for leveraging technologies to automate accounting and auditing profession including preparation of financial reports and disclosure checklists.

Figure out how to appropriately apply technology. Audit 4.0 can utilise sensors, embedded computers, and software modules to collect data across the company and from external sources, such as vendors and customers in close-to-real time. Data analytics techniques and business models can be deployed for monitoring product quality, identifying machine faults, saving costs, and facilitating decision making. Audit by exception highlights major issues in an automated audit. The audit will be able to provide assurances.

Training For Adoption and Adaption of Right Technology

The double-entry bookkeeping process of "ticks and ties" and "cross casts and foots" will be sacrosanct while adapting the innovative methodologies of the digital age. Accounting and auditing, being knowledge-centric professions, hunger for learning new knowledge and skills makes a good professional. AI is a game changer. Knowledge of how AI can help, and what AI can do and how it can add more value for the clients creates new opportunity for accounting and auditing professionals. Machine learning, data mining and cognitive computing can be used to analyse structured and unstructured datasets from multiple sources in shorter timeframe. AI tools can help in complex leases in real estate, contracts, identification of risks and detection of fraud.

Professional accountants and auditors need to be proactive; get retrained, adopt and adapt to make the transition over the next three to five years. The education system for the next generation of

AI is a game changer. Knowledge of how AI can help, and what AI can do and how it can add more value for the clients creates new opportunity for accounting and auditing professionals. Professional accountants and auditors need to be Proactive; get retrained, adopt and adapt to make the transition over the next three to five years.

The three specific new technologies that can be used to modernise accounting and financial reporting include XBRL-based structured digital financial reports; Knowledge-based expert systems and other application of artificial intelligence; and Blockchain-based distributed ledgers.

accounting professionals must help them to acquire the right skills. The rules of logic and reasoning used by computers must be taught. XBRL-based digital financial reporting principles must be understood to convey to the software developers about the changes required.

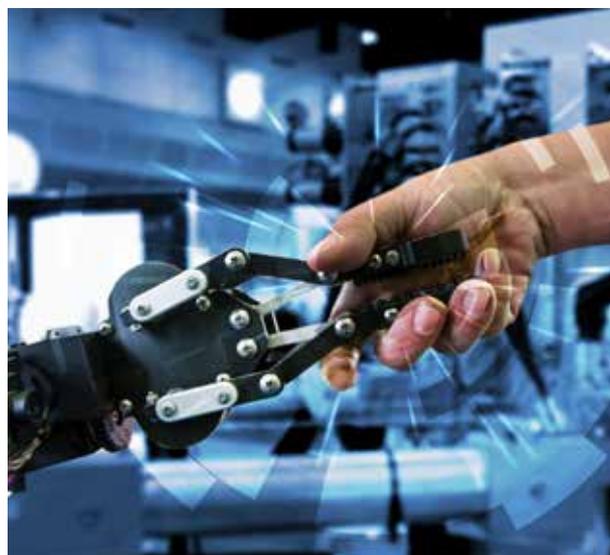
Quality digital financial reporting process makes financial reports error free. The technology will help CAs perform tasks that can be performed by machines. In 1929, the U.S. made the Generally Accepted Accounting Principles for applying in the financial reporting evolving as International Financial Reporting Standards (IFRS) in around 1975. In 1999, the American Institute of Certified Public Accountants (AICPA) developed the global standard XBRL. The three specific new technologies that can be used to modernise accounting and financial reporting include XBRL-based structured digital financial reports; Knowledge-based expert systems and other applications of artificial intelligence; and Blockchain-based distributed ledgers.

Challenges and Emerging Opportunities

A global report titled “The Robots are Coming” pinpoints the strategic value to the profession, specifically in finance functions. Accountants and auditors will face significant loss of jobs when businesses become increasingly automated as robots, AI robots take over. To compensate losses of certain kinds of jobs which computers can perform better than humans, there will be a generation of new kinds of jobs. After all, computer must be fed with right accounting and auditing software programmes to apply cognitive intelligence to perform accounting and auditing tasks. Technology-savvy accounting professionals can only converse with the accountancy-savvy software programmers to create the requisite AI based innovative accounting and auditing tools. Appropriate strategy for transitional phase is a must. When rapid changes occur, jobs pertaining to general ledger, accounts

receivable and payable will be substituted by AI technologies; but job losses may be compensated by a generation of value-added services in customer care, financial planning, consultancy analysis, and taxation.

Competition can become severe, but there will be a demand for higher-quality accountants who can provide sound business advice. The transformation may take some time. There can be new highly judgement- and intuition-based jobs which cannot be done by AI. Automation will make things easier by using the advances in data science and AI. Advising clients and providing strategic insights on critical financial transactions are not easy to be replaced soon. Keeping abreast of technology is important to maintain a competitive edge in the market. Enterprise resource planning (ERP) systems requires a manual labour to complete a process. The professional accountants must enhance their knowledge of new business models and AI systems. Automation helps to perform transactional and routine tasks like data entry, bookkeeping and compliance work, leaving the accounting and finance professionals to focus more on value-added services.



Automation helps to perform transactional and routine tasks like data entry, bookkeeping and compliance work, leaving the accounting and finance professionals to focus more on value added services.

Enjoy Working With Smart AI Robot Workers

Adoption of robotics in workplace is going to be the new normal. Jobs will be created, enhanced and destroyed. This maxim is not an exception to accounting and auditing profession. Identifying, examining, and testing the data and providing evidence can be performed by automated audit system. Continuous audit monitoring can become a reality. Auditing can bring new insights for key business decisions on an ongoing basis. Operational costs of business can go down. Automation can reduce the cost of audits and add new value-added services. 100% validation and reconciliation of all auditable transactions enable audit practitioners to provide challenging consultancy assignments.

In the near future, professionals may have to collaborate and work as a team with robots. The value creation is possible in different spheres: cost-benefit analysis, economics of production and innovation, profitability analysis, industrial economics. AI-based tools support auditing, and free the auditor from mundane tasks. Expert AI-based IT systems add efficiency in trading in stock market, portfolio management, financial planning, contracts management, bidding process, real estate contracts, mergers and acquisitions, identification and mitigation of risks, and fraud detection. AI tools can solve complex taxation issues within split seconds by referring to all relevant direct and indirect tax provisions, related case laws and judicial interpretations. The expert AI systems in financial applications can help in coordination of multiple users. For example, one audit system, AY/ASQ can consolidate works of an individual over different periods of time or compare and consolidate the results of professionals working in multiple locations.

AI and Automated Solutions

There are software for automated solutions to varied accounting, tax, bookkeeping, and auditing processes. Accountants and auditors ensure that the financial records are accurate, taxes are paid timely and applicable accounting concepts, principles and standards are complied.

AI has the potential to alter the profession fully. A study says that AI devices may relieve accountants from performing burdensome tasks enabling them to focus on value-added consulting services.

Business models are changing to take advantage of big data analytics, innovative business modelling techniques, proficient with accounting software. There will be increasing need for professionals who can take the challenge and collaborate working with robots with the right skills. AI is critical for the accounting and auditing professions to add on efficiency and effectiveness.



Monitoring and evaluating of compliance with regulations, organisational policy, employee evaluations and hiring and firing, tax filing may undergo changes.

New AI tools like Amazon's Alexa and Microsoft's Cortana recognise voice and respond to user demands. Data makes AI efficient, effective and smarter. Google and other companies are making AI products to access big datasets. International Data Corporation (IDC) projects over 212 billion sensor-enabled objects by 2020 for AI applications.

Business models are changing to take advantage of big data analytics, innovative business modelling techniques, proficient with accounting software. There will be increasing need for professionals who can take the challenge and collaborate working with robots with the right skills.

AI is critical for the accounting and auditing professions to add on efficiency and effectiveness. The repetitive tasks and processes are going to be automated, leaving the higher value specialities involving professional judgement. E-tax filing simply changed the focus from paper and pencil entry, to computer and software entry. In every threat of losing jobs, new opportunities emerge with a generation of new kinds of judgement-based jobs. ■