Emerging Technologies: Business Imperatives

Lt. Gen. J.S. Ahluwalia PVSM (Retd.)

Introduction

The world has been on a cusp of a technological revolution. In today's fast paced hyper-competitive global economy organisations have to be prepared from within to cope with the change. Technology integration has to be in harmony with corporate capabilities and local culture. Advances in materials science, information technology, electronics, computer science etc. have enabled the technolo -gical base of many industries to change rapidly and unpredictably, causing a paradigm shift in technology appli -cation.

The beginning of 21st century had undoubtedly brought radical change in our lives, and we have been experiencing one of the most thoroughly documented industrial revolution in mankind's history. To navigate this turbulent geo-political and economic time, businesses need leaders with foresight, resilience and agility. Technology is transforming the global economy. It's changing the very fabric of business and organisations. There are other forces at play too; globalisation and protectionism, changing expecta -tions of individuals in the workplace, shifting social mores and values, new types and levels of connectivity and demographics.

The global economic and business landscape has been changing at a speed and with an intensity, which seems unprecedented. Factors resha -ping the world include climate change, resource scarcity, geopolitical conflict tempering growth, unpredic -table emerging markets, widening inequalities, ageing population with a burgeoning middle class, huge shifts in corporate and political power, and the increasing pace of digital innovation; to name, but a few.

The year 2020 started with Covid-19 global pandemic, an unprecedented, unrelenting human tragedy; one of the worst health and finance emergency the world has ever witnessed. It put brakes on economic growth, pushing the world into largest recession since 1933. The suddenness, the spread, and severity of the pandemic caught governments, business and society around the globe unaware. It has dramatically disrupted life and business significantly, impacting economy, health and safety. Geo-political and economic disruptions have disrupted strategic global supply and value chains. Health, lives, inclusion, diversity and sustainability have been at risk during this crisis.

Agile board leaderships with conceptual skills were necessary to steer the organisational and technical transform -ations, through this turbulent period. Organizations needed a digital recovery with accelerated re-skilling of staff, safe contactless engagement with dynamic customer insights and digital outreach. As we emerge from the rigours of the lockdown, data analytics has helped accelerate the recalibrated corporate journey, through cloud based data platforms to reboot the operational economy. The Covid-19 Pandemic is not going to go away soon. Old days and old norms won't return fully. New options will reshape our portfolios, with revised market offerings. Although remote working has not been a panacea, we are likely to retain some of its positives, like 'online training' and 'virtual meetings' etc.

Review of Emerging Technologies

Technology has been moving at an exponential pace. More has changed in last 50 years, than in the previous 500 years. The emerging technologies and disruptive innovations are altering the business landscape, and driving the next phase of business

growth. Technologies, such as mobile communications, cloud computing, digitization, robotic process autom -ation, Artificial Intelligence (AI), Data Analytics, Internet of Things (IoT), 5G and blockchain, are changing the way work is done and the workplace organized. Never before, so many technological trends have matured and converged at the same time, changing the playing field itself. These are poised to deliver enormous productivity gains.

Technology will play a significant role in shaping the global economies in the coming decades. Digital governance is good governance; digital delivery is faster delivery; and digital monitoring is effective monitoring. 'Internet of Things' is the latest trend of connecting sensors from everything, from door locks and wearable devices to traffic signals and a vast network of devices, to a centralized automatic control. IT infrastructure and most of all their data and Cloud solutions fused with disruptive technologies – like Blockchain, IoT, big data, and predictive analytics can revolutionize businesses and industries. To win in the cognitive era, data matters.

So far, the power of all advanced technologies has been restricted to select institutional investors, and algorithm-based trading. Smartphone and likes have been the biggest enablers for current financial inclusion. New technologies like Artificial Intelligence and advanced Analytics will make managing and investing money easier than ever before. Scaling up the revolution is driving India's transition towards a digital economy. The quest for hearts, minds, and wallets of the consumer is getting harder. Brands are vulnerable to sweating consumer mood. Social media's viral and trigger-happy nature, has put tremendous pressure on consumer trusts in brands.

There have been tectonic changes in the world which are not linear, but exponential in nature. For every trans -formation, destruction is a must. Shiva destroys to recreate. Transfor -mation caters for changing organizational culture, and people's mind set. Technology changes quickly, but organisations adjust slowly.

Disruptive innovation is altering busin -ess landscape across the world. Organisations have to constantly re-invent themselves and their business processes, to stay relevant. The future of work looks scary. The world by 2050 will be a place in which robotics, advanced materials and emerging technologies could make our lives longer and unrecognisable.

In this age of creativity, innovation and digital revolution, it is important to keep pace with the change. Business leaders are trying their best to find ways to remain relevant in the market and get ahead of others. Disruptive innovation has become the game changer in today's scenario.

Data Management

New age technologies can progress seemingly unrelated data, to help generate valuable insights. 'World Wide Web' founder Tim Berners Lee, said “I want the web to reflect our hopes and fulfil our dreams, rather than magnify our fears and deepen our divisions.”

The integrity, privacy, and security of data remain our prime concern. Corporates create and own domain-specific data sets that build vertical industry solutions in specific professional fields like healthcare etc. Technology is a business enabler. Enterprises need cognitive solutions that turn vast amount of data into insights for competitive advantage. As data privacy and technologies become pervasive, disruptive, and liberating, we need to think about responsible 'Data Analytics'.

Enterprises need cognitive solutions that turn vast amounts of data into insights and competitive advantage. A hybrid multi-cloud storage approach can optimize the movement, placement and management of your data. Trends predict new age marketing would be powered by data. Driving digital marketing would include personalized, real time, content and influence marketing. Thought leadership will become a valuable driver of trust, among buyers.

India ranks number one in using data, more than China and USA put together. EU, Japan and China have taken decisive steps in creating data rules. India needs rules, dealing with all aspects of the digital business. This will set the foundation for a thriving digital business space, no-longer monopolized by a few. Regulation tightening, data privacy, and security have become top concerns of our government. The Indian government set up the 'Srikrishna Committee' to identify “key data protection issues”, and suggest a draft 'Data Protection Bill'. Report and recommendations for the 'Data Protection Bill' are under scrutiny, for issue by the Govt.

Analytics

'Analytics' refers to the processes and techniques of data analysis, for generating knowledge and intelligence for strategic 'Decision Making'. 'Business Analytics' focuses on sophisticated information technologies to offer data-driven insights, for improved decision making.

Data Analytics is the key to derive insights and value from data deluge, and has the ability to stay agile in a world of flux, with a priceless competitive edge. Behavioural data with visuali -zation can highlight buying habits, changing needs and trends in buying patterns. Today only 4% of the organisations are able to derive proper value from their data. Analytics can help companies to see patterns in their data that enable them to predict issues and triggers, before they happen instead of being forced' to react to them after the event. The new innovations in denomination data engineering, hold the key to advanced analytics. Automation of analytics has become a necessity, in order to tackle the deluge of data-driven problems.

Digital Technology

The dot.com boom at the beginning of this century led to the digital revolution. Digital transformation is more about a journey than any destination; the endgame is uncertain as goal-posts keep moving. Skilled manpower is a challenge for growth of digital economy. Digital marketing has multi-mediums for fizz and influencer outreach, like search engines, web analytics, and social media i.e. Twitter, LinkedIn & Face book for marketing engagements. Futuristic, dynamic digital technology space, is moving us to new horizons, set to empower and ease our life. Today Indians are consuming an average of 4GB data a month on everything from entertainment to shopping. By next 5 years, there will be over 600 million Indian's with smart phones, each consuming similar content and transacting digitally.

The key areas, while playing the digital game are partnerships. Digital transformation, processes, products, systems and gadgets, are now a $2 trillion catchphrase. Some companies are even born digital like Google's and Amazon, while few become digital like GE and Burberry's etc.

Digital is all about connecting cust -omers, employees, and machines. Digital is not a special entity, but the core of utility. Digital transformation is about leveraging technology to uplift user experience across the value chain; fine balance between technology values and consumer needs. User has adjusted well to new digital banking touch points. 'Digital Futurist' has become a new corporate designation. A panoramic view of various digital marketing mediums that businesses can use for escalating growth, will give deep insights into the art and science of search engine marketing, social media marketing, online PR, and influencer marketing.

PM Modi considers “Digital India” as a major economic growth driver, and therefore it is strategically listed among the top priorities of the Government, to transform India into a digitally empowered and knowledge society.

Artificial Intelligence (AI)

Definition of Artificial Intelligence (AI) is 'a computer system capable of performing tasks that normally require human intelligence'. The intelligence in 'Artificial Intelligence', constitutes a combination of processing power and access to data enabling analysis of entire population of data, to identify patterns or exceptions. AI is how to make machines mimic human thinking and action. AI can process billions of data points, to arrive at an efficient decision in the blink of an eye. Of course the contextual, emotional, creative and intuitive aspects of decision making will remain the prerogative of human judgment, which will be hard to replace. The merging of man-machine is out, to create a powerful workforce.

Cognitive computing refers to systems that learn at scale, reason with purpose, and interact with humans naturally. Rather than being explicitly programmed, they learn and reason from their interactions, and from their experiences with their environment. AI and cognitive technology are being developed to augment human intelligence to enhance and extend human capability, by embedding them in the processes, systems, products and services.

The age of artificial intelligence is creating an invisible revolution, and is changing the nature of work. As every interaction is becoming digital, organisations must set the pace for transformation and for AI to comple -ment rather than disrupt work. AI will augment, not displace jobs. Leaders need Soft skills to create new AI led innovations, adaptability, and continuous learning. AI will augment human ingenuity. Technology has its upsides like improving access to services, and down sides like replacing person to person interactions. We need to lay foundation for an AI- centric, future ready work force.

AI is driving an invisible revolution within the workplace. Sudden acceleration of automation in banking, finance, healthcare, risk and fraud detection sectors, have considerably accelerated the adoption of new age technologies.

AI will transform all major industries like the present healthcare, education, transportation, retail, communications and agriculture etc. AI and robotics are replacing, and will continue to replace, traditional jobs. Over the next 20 years 30% to 50% of jobs are at risk due to AI and technological displacement. AI is advancing to a level where systems become so intelligent, that they surpass human capabilities and comp -rehension.

Disease diagnosis will become faster and more reliable, allowing people to live longer and healthier lives. Risk management has one of the largest opportunity for incorporating and strengthening the use of AI. Driverless vehicles, smarter public transport, and public space design will improve urban quality of life. Simultaneous translation software will increase opportunities for global collaboration, by removing language barriers. Chinese talk of demise of human translators by 2029.

Corporates can harness the capabilities of AI and data analytics, to aid their decision-making processes and improve their work efficiencies. Jobs will be redesigned around the AI and data analytic ecosystems. Systems will be reconfigured or replaced, so that data can flow seamlessly across platforms. This improvement is not incremental, but transformative. AI is the future. Google, Microsoft, Amazon and Apple are all making big bets on AI.

The merging of man-machine is to create a powerful combined force. A company called Neuralink is in the process of developing

devices that can connect direct to the human brain. “It will just be a chip in our brain, like a smartphone in our hands.” With the supercomputing power of AI and chips embedded in our brains, superhuman qualities can be acquired by integrating the best of what man and machine together can accomplish.

UK Govt. has set up a 'AI Council' to champion responsible adoption of the technology. £1 billion annual investment and research grants is to ensure that public engagement is integrated into a project strategy. The recent global summit on Artificial Intelligence – 'Responsible AI for Social Empowerment' (RAISE), 2020, charted a course on use of AI for social transformation, inclusion and empowerment in areas like healthcare, education, agriculture and smart mobility.

Internet of Things

Internet of Things (IoT) connects everything from door locks, lighting, TV, oven, water heater and other devices like traffic control signals with a vast network of physical world of sensors and devices, connected through internet.

Data generated by sensors will streng -then systems and supply chains. 'Wearable human devices' will help monitor our exercise, sleep and other health habits. 'Patient monitoring devices' maintain electronic records and operate other smart life-saving accessories. Connecting more things to the internet has the potential to increase efficiency, lift productivity, reduce waste and fuel economic growth. Once IoT starts supporting billions of connections among cars, trains, factories and hospitals, the operating costs will sky rocket unless network can be maintained with little human intervention. Fully networked IoT could add up to $11 trillion to global economy by 2025, with 100 billion connected devices.

IoT is bridging the gap between the digital and the physical world. It offers new sources of data and business operating models that can boost productivity in a variety of industries. With the International Data Corporation (IDC) putting the worldwide spending on IoT as USD 1.10 trillion in 2021, IoT is a big thing. According to IDC, IoT hardware will be the largest technology category, followed by services, software and connectivity.

Robot Process Automation

Robotic Process Automation (RPA) technology mimics human actions performing simple rule based processes. It takes the robot out of the human. Progressively, every job with predictable routines could be automated. Robot mimics a process, rather than analysing data; works faster, non-stop, more accurate, and is scalable.

In the early 20th century, the concept of robots in society found its way into science fiction, when Rossum's Universal Robots premiered in Prague in 1921. The play told the story of sentient Robots that rose up together and killed their human masters. George Charles Devol is widely recognised as the father of robotics for having invented the 'Unimate', the world's first industrial robot in 1954. 'Unimate' was installed in General Motors's auto manufacturing plant in the early 1960's, and the robot was designed specifically for die-casting and spot welding. Seeing the early success, Ford was quick to come on board, and other car manufactures similarly followed suit.

Robotics and artificial intelligence are set to eliminate many tasks and roles, and change the rest. Robots will take over the repetitive jobs, including routine decision making. Both organizations and individuals have to be ready to face fundamental changes in the workplace. The spectrum of automation expands from simple rule-based automation to advanced cognitive and artificial intelligence automation. The ability to automate depends on three factors: the type of input it can read; the amount of data it can process; and the nature of output it can generate. Economist Andrew McAfee, writes, “We are facing a time when machines will replace people for most of the jobs in the current economy, and I believe it will come not in the crazy too distant future.” Accenture suggests that the potential of automation can increase labour productivity by 40% by 2035, especially in the 12 global large developed economies.

Today, we are in the midst of a changing landscape, where advances in robotics and automation are finding their way into the “softer” service areas, not just manufacturing. Leaps in artificial intelligence and machine learning have seen virtual assistants deployed in various retail products. Commercial enterprises are employing chat bots to assist and guide people through their online shopping experience. In Japan, there is already a hotel that has introduced a responsive robot that can check people in, brief and escort them to their rooms. It can speak to the guests in either Japanese or English language, and can even field some basic questions.

As per the World Economic Forum report, about five million jobs have already been lost to robots and automation by 2020. AI has phenomenal power to substitute repetitive tasks that require sequential logic. Some of the jobs that could be outsourced to AI powered digital assistants include entering timesheets, scheduling calendars and routine accounting, billing and HR tasks. By 2025, Robots would have taken up over 30% of the present jobs. In terms of dollar value, the robotics sector is expected to rise to $67 billion by 2025.

Block Chain

Blockchain came up in 2009, as a secure distributed ledger system to record financial transactions of its members. Blockchain registers every single transaction, may be financial,

IOD Institute of Directors — Building® Tomorrow's Boards

How to qualify 50% in
Online Proficiency Self-assessment Test?

Are you **READY** to serve on a
Board of Directors?

NOW REGISTER FOR ONLINE PROGRAMME

Join the Orientation Programme (Online) for

Independent Directors' Proficiency Test

2 Days Programme

NEXT SCHEDULE : June 26 - 27, 2021 *(Registration Open)* **WEEKEND**

Batches running parallel, having maximum 25 participants in each batch

BENEFITS/OBJECTIVES

Enhance your reputation on Boards • One year complimentary membership of Institute of Directors to non-members • Strengthen your ability to secure directorship opportunities • Synchronous and systematic learning by renowned speakers • One to one communication through online query redressal

As per Companies (Appointment and Qualification of Directors) Fifth Amendment Rules, 2020, every Independent Director and Aspiring Independent Director who have served as Director for less than 3 years is required to pass an Online Proficiency Self - Assessment Test.

LIMITED SEATS
subject to availability at the time of registration

Registration Fee

Fee: Rs. 10,000 + GST 18%
(SAC 999293)

Discount on Registration Fee:

- 10% for IOD Members
- 15% for Alumni of Masterclass for Directors of IOD.
- 10% for Woman participants

(In any case, total discount shall not exceed 15%)

for latest schedule & to register online, visit
www.IODGlobal.com

hospital records, or government data. It is an internet rotary service that updates transactions, making them immutable. Ledger can record ownership transfer of any type of assets, claims or obligations of all assets from property to commodities. The world is excited about the potential of block chain. Blockchain can make the reconciliation of accounts of government efficient and seamless. This improvement is not incremental, but transformative. Fourth generation Blockchain platforms will enable a secure end-to-end transactions concluded in under two seconds, irrespective of the broadband speed.

India is in the early stages of a land-title registry system, on top of which you can tokenize ownership of real estate. Today, Blockchain and cognitive technologies are helping reshape industries, in domains as varied as finance, healthcare, and government. Blockchain is the technology underpinning the Bitcoin and other crypto currencies. The government of India is firmly behind the Blockchain technology for tamper-proof land records, verifiable higher education certificates, trade finance and so on. New community centric business models are creating block chain databases. Assets are referred to as digital coins, accessible through a wallet on Smartphone. User can buy, sell or transfer tokens. Transactions are real time, and do not involve middleman. They are recorded on the block chain and are universally visible transactions, executable across the globe.

In April 2018, 22 countries have created a 'European Blockchain Partnership'. Ruler of Dubai has also launched 'UAE Block chain Strategy 2021'. It has announced a 'Dubai Blockchain Business Registry Project', for providing secure end to end transactions. To stay ahead of the curve and explore opportunities, Telangana Govt. has already announced the formation of India's first Blockchain district, in partnership with Tech Mahindra.

Integration and Impact of Emerging Technologies

The first industrial revolution utilised water and steam power for mechanizing production. During second industrial revolution, application of power was more with the objective to obtain mass production. During third industrial revolution, industrial automation was introduced, which involved vast application of Electronics and Information Technology. The fourth industrial revolution, termed as 'Industry 4.0', is empowered by a wide range of digital technologies, e.g. Artificial Intelligence, Machine-Learning, Advanced Robotics and automation, and including new materials and advances like Graphene, genetics and sensors etc.

Technology on its own is never the answer to any question. It is always the enabler for streamlining and standard -isation of the processes, across multiple geographies. The failure to use technology's benefits will leave organisations vulnerable. Today, every element of an organisation's business model is impacted by cognitive sciences, artificial intelligence, virtual reality, and robotics.

The sole purpose of technology is to simply amplify and magnify the human ingenuity. Technology has impacted diverse industries, in myriad ways. By approaching workforce challenges holistically rather than mechanically, companies will be able to position themselves move effectively for the disruptions they anticipate. Technology needs to be leveraged fully, for achieving the required goals. Project creation holds the success for realising vision, taking cognizance of technological breakthroughs and disruptions, and emergence of industry 4.0.

Conclusion

The 21st century corporate focus is on technology enabled growth and development. The economic prosperity and quality of life for all, depend to a great extent on the creative and innovative ability of directors. Today, we have an economy that is non- linear, volatile, and turbulent. The technolo -gical integration, growth and sustain -ability are the 'corporate ways' for the future. The role of directors in business growth, is moving up from complex technology to strategic leadership.

Data is often cited as the 'new oil'. Advanced analytics is providing organizations the ability to stay agile in a world of flux, a priceless competitive edge never before enjoyed. Data is the new denomination of this competitive advantage, and a clutch of companies are leveraging information to the fullest. Good Governance and sustainability are the ways of the corporate future.

Boards have a responsibility to effect -ively manage risks and opportunities related to sustainability. Today, majority of the boards are engaged in their company's sustainability efforts, to help achieve UN Sustainability Development Goals (SDGs). The 'UN's 2030 agenda for Sustainable Development', with it's '17 goals' and '169 associated targets', provide a good opportunity for busin -esses to align their corporate strategy and goals in national and global interests.

Basic engineering education must develop engineers of tomorrow, with broad based skills of sustainability, environment, and social-sciences, along with both hard & soft leadership skills. The Institution of Engineers (India) is moving boldly into the future. It's easy for any organisation that has been successful, to rest on its laurels. The biggest risk can be complacency, which IEI can't allow.

Most engineers, no matter what their primary discipline is need to be multi-disciplined to the extent that they understand the

issues involved in their application and management. It is essential that engineers become advocates of multi-disciplined enginee -ring approach, good governance and sustainable development. The senior professional engineers should be trained for and involved in leadership, corporate governance and finance areas of business growth. The profess -ional engineers must recognize their obligations to the global community in its widest sense, about from those to the employer, colleagues, and clients. The practicing engineers need to know the duties, requirements, and needs of corporate leadership, SDGs, corporate legislation, and governance, as never before.

Engineering opportunities are a race for relevance. Engineers have the vision, but what they need is a resolve and an effort to make it happen. Technology is not a neutral place for geo-politics. Finally, we all should check, whether the sun is on our face, and if not, turn towards it. Sir Winston Churchill said "It will be a tragedy, if the sunrise of technology, were to be the sunset of mankind".

Lt. Gen. J. S. Ahluwalia PVSM (Retd.) *is President of the 'Institute of Directors' (IOD) and of the 'World Environment Foundation' (WEF). In the past, he has been President of 'Delhi Management Association', Chairman of Delhi State Centre and Chairman of the Board of Governors of the 'Quality and Safety Forum' of the 'Institution of Engineers (India). He retired as the Director General of EME, Indian Army. He is also an author & editor of a number of corporate books and articles, and is a trainer of top management on Corporate Governance boards and directorship courses.*