



TMT industry CEO outlook: Smart, Secure, Sustainable

December 2020

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Foreword

I would like to welcome you all to the fourth edition of India Mobile Congress (IMC), South Asia's largest digital technology forum. The theme of this year's event is 'Inclusive Innovation: Smart, Secure, Sustainable'. This special edition being held virtually for the first time in light of prevailing circumstances is another commendable achievement for IMC, which has established itself as a world-class event in the field of Telecommunications, Media and Technology (TMT), bringing together players from across the TMT sector to deliberate, debate and discuss critical developments in the industry.

This year our objective is to identify and discuss areas that will play a critical role in steering us through and out from the uncertainty caused by COVID-19. We will focus on the digital transformation journey enabled by emerging technologies such as IoT, AI and cloud computing and the underlying strong connectivity infrastructure that has been powering digital adoption in the country. This event will also provide a platform for industry players to showcase their offerings to tackle current and forthcoming challenges faced by the sector.

India's digital economy has been growing from strength to strength, with support from government schemes such as JAM (Jan Dhan, Aadhaar and mobile), Digital India initiative, National Digital Communications Policy (NDCP), National Broadband Mission and other incentives rolled out under the Atmanirbhar Bharat campaign such as production linked incentive (PLI). The onset of the pandemic has reinforced this trend with a massive surge in the use of digital tools and applications by almost every industry sector including banking, education and healthcare. Consequently, this has created an immense opportunity for India to emerge as a digital hub owing to its large domestic customer base and market potential.

To transform the digital vision into a reality, all stakeholders from established and emerging technology companies, telecom players and the government need to come together to ideate and collaborate. Telecom players must continue with their efforts to create a robust high-speed network infrastructure. Start-ups working on emerging technologies could help enable digital transformation initiatives for businesses. Importantly, the government should continue to act as a catalyst by providing supportive regulations such as incentives for domestic manufacturing, national cybersecurity framework and viable 5G spectrum policies.

Our thought leadership paper put together by our knowledge partner KPMG in India evaluates the current thinking of TMT organisations in response to the pandemic, and their perception towards challenges and opportunities brought about by the digital acceleration. These perspectives have been collated through the help of a survey conducted by KPMG in India amongst industry leaders. I would like to thank the teams across IMC, COAI and KPMG in India for working together to deliver this programme to you.



Lt. Gen. Dr. SP Kochhar

Director General
COAI



Foreword

Welcome to IMC 2020. In its fourth year, IMC continues to be a platform that facilitates collaboration among industry experts from various domains in the TMT industry to discuss and present their point of view on the current status and outlook for the sector in India. IMC is proud to play a role in promoting entrepreneurship, innovation and international collaboration within the TMT industry.

The theme for this year's event resonates with the current industry scenario, highlighting the disruption in business operations caused by COVID-19 and the emergence of the TMT industry as a key propeller for businesses to pivot to the new normal. The use of smartphone devices and data usage has soared with the pandemic, unlocking previously untapped demand streams relating to emerging technologies. This has in fact turned out to be a silver lining for the TMT industry. Digital payments soared as consumers became wary of using cash. Online healthcare services witnessed a significant rise due to increase in demand for remote medical consultations. The entire education sector is currently dependent on the telecom infrastructure in the country to enable online classes following the closure of schools and universities. The government has also played a crucial role in ensuring equitable access to telecom services through various programs and initiatives such as the National Broadband Mission and providing support to Telecom service providers (TSP) during the pandemic to ensure connectivity and functioning of online services.

Evidently, an increasing number of businesses are transitioning to a digitalised operating model. In this context, telecom operators and IT companies are working closely to develop the required technical infrastructure for enabling digitally empowered businesses. The industry is witnessing strategic partnerships between telecom players and global IT majors and network equipment providers. The key objective of such partnerships is to develop a roadmap for boosting network and infrastructure capabilities to cater to the rising data and bandwidth demands, as well as enable 5G services and field deployment in the future.

I would like to commend the IMC, COAI along with KPMG in India, for having put together a comprehensive report that focuses on how the TMT industry is digitally empowering businesses to ensure future survival and gain a competitive edge on a global scale. I would like to acknowledge their efforts in the development of this timely and insightful publication.



P Ramakrishna

CEO,
India Mobile Congress





Foreword

The year 2020 has been extraordinary — the pandemic led health crisis has given birth to a new reality where digital ambitions have been realised. Organisations had to quickly adapt to new ways of operating remotely. Digital transformation, powered by emerging technologies such as artificial intelligence (AI), internet of things (IoT), augmented reality (AR) and virtual reality (VR), brought into reality the feasibility of conducting online business for sectors such as education, healthcare, consulting, retail, which were mainly centred around personal interaction.

Technology has not only assisted organisations in dealing with the pandemic better, but its very adoption has also accelerated. Organisations are focused on digitalising their business models to optimise business operations and cater to constantly changing customer behaviour. Additionally, they are looking to transform their workforce models by enhancing human skills with latest technologies such as automation and AI, to emerge more resilient. To drive this, the TMT industry is witnessing collaborations among technology solution providers, system integrators and communication service providers to offer converged products and services to customers.

To magnify the potential benefits offered by newer technologies, high-speed connectivity will play a crucial role in providing near real-time decision-making support to humans and machines. Steps taken towards network virtualisation, cloud and edge computing will help capitalise on the opportunities presented by enhanced network solutions. This will also help pave the way for 5G implementation in the near future.

During this period, the Indian government has launched various initiatives such as Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing to promote vertical

and horizontal integration of digital hardware and software applications. These initiatives aim to harness the opportunities created in the wake of greater digital adoption and realignment of global supply chains.

Overall, the future of the TMT sector in India looks both exciting and promising, with growth in digital demand alongside the emergence and adoption of new technologies. The innovation and progress in TMT sector will certainly be a critical factor in driving India's larger digital ambitions.

In association with IMC and COAI, KPMG in India is proud to present the report, 'TMT industry CEO outlook: Smart, Secure, Sustainable'. The report provides insights into how the industry is thriving in the 'New Reality' and how TMT CEOs are focusing on harnessing the next wave of growth empowered by the digital revolution in the nation.



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Main themes and findings from our research

Economic outlook



Despite being characterised by uncertainty, 2020 has allowed for transformative change through redefined leadership, global supply chain realignments and evolving business models. The TMT sector has a pivotal role to play here as digital transformation takes precedence among board room strategies. The upsurge in demand from both end-users and businesses during the pandemic has reinforced the surveyed **TMT CEOs' positive outlook on the growth of the sector.** Companies are capitalising on India's growing digital economy and witnessing increase in revenues as well as private investments. However, to sustain this momentum and steer it further forward, the government and TMT organisations need to find newer and deeper ways to collaborate.

Imminent risks



The pandemic led to the exposure of latent risks in supply chains, emerging technology and cyber security, in addition to the more conventional financial and regulatory risks.

Supply chain risks gained focus as manufacturing hubs across the world came to a halt owing to global lockdowns, delivering a blow to the availability of critical components. Geopolitical tensions further aggravated this threat, and companies had to restructure their supply chains to reduce dependency on specific geographies. This risk has given TMT CEOs an opportunity to realign their supply chains to bring them closer to the end customer. An estimated 45 per cent of the CEOs surveyed said they were **considering supply chain realignments to increase resilience against natural disasters.**

Emerging technology risk is becoming increasingly significant in the long run. With the emergence of newer technologies, companies need to consistently innovate and stay ahead of disruption and mitigate the risks arising out of these technologies.

Cyber security concerns continue to mount as people are working from home, leaving **organisations more vulnerable to breaches from less secure endpoints.** With the increasing use of digital tools and cloud-based applications, this threat is intensifying.

Regulatory and financial risk factors have been impacting the sector for a few years now **forcing companies to operate under stringent regulatory policies and their associated financial burden.** High taxation and levies have added to the existential crises for some organisations that have been reeling under significant pricing and margin pressures.



As new and enhanced communication and digital technologies are adopted around the world, it has become increasingly important for leaders in the TMT sector to understand the complexity and business transformation impact of these new products and services. To capture how the sector is adapting to these changes, KPMG in India together with IMC surveyed the immediate and more longer-term priorities of the leadership at leading TMT companies. Summarised below are the key findings:

Transforming the life of a digital customer



The pandemic compelled businesses to transition towards full or partial remote working conditions. As a result, several organisations **expedited the implementation of digital initiatives that were slated for the next three to five years.** This led TMT organisations to examine not just the changing consumer demands and usage patterns but also the best way to meet these service obligations. The result was the creation of next-gen digital business models and revenue streams, enhancing digital customer service experience, and supporting the creation of a new workforce model that supports the adoption of emerging technologies to augment human effort.

5G



A comprehensive network reach, increasing affordability of smartphones and mobile data services, and change in the viewing habits, are currently driving data usage in India. High speed data requirements propelled by the pandemic, are expected to drive 5G efforts in India. Although telecom players are inking strategic deals with network infrastructure providers to bolster their ability to deliver 5G technology, the high price of 5G spectrum, significant infrastructure investment requirements, and regulatory policy concerns are impeding its commercial launch. While there could be some delay in launch of 5G considering the current COVID-19 situation, elongated 4G monetization period and hyper price sensitive market, the country can potentially stand to benefit from a delayed adoption through the availability of more mature business use cases, numerous prototypes and a collaborative environment to ensure profitable and sustainable 5G deployment on a large scale.

Emerging technologies



With the acceleration of digital transformation initiatives across industries due to the pandemic, businesses are assessing the potential of emerging technologies to enhance their business and operational processes. Prior to COVID-19, investments and business priorities related to emerging technologies were fragmented. However, enterprises are now focused on aligning their emerging technology strategies with the overall business objectives to ensure not just future survival but also simultaneously gain a competitive edge. Our survey also tried to identify those technologies generating the most impact and ones seeing maximum investment. The survey revealed that while India Inc.'s **current table stakes are on data analytics and cloud, it is IoT, blockchain and AI that are projected to be strategic investments with AR and VR emerging as the future stars.**



1.

Economic outlook





The Indian TMT sector has served as a catalyst for digital progress in the country. Though the sector, specifically telecommunications has faced significant headwinds in the past, there is no doubt that it is the critical accelerator of the country's trillion-dollar digital economy.¹ This was further corroborated with the experience of COVID-19, where the sector was able to support the near complete transition of our lives from a physical to a digital domain. In one sense, the pandemic has helped reveal hidden demand streams, proving to be a proverbial silver lining for the overall TMT sector. Both end-users and businesses are witnessing a widespread adoption of digital technology.

COVID-19 and the telescoping of digital trajectories

The telecom industry was struggling with massive amounts of debt alongside falling profit margins on account of unsustainably low prices. When the nationwide lockdowns were announced however, Indians started transitioning much more rapidly online for entertainment, banking, education and work, consequently increasing broadband and technology usage manifold. For instance, during the lockdown, there was an increase of about 13 per cent in internet consumption² with many subscribers upgrading their broadband plans to meet the higher data requirements. The use of digital payments soared by 42 per cent as people were restricted to their homes, and wary of using cash.³ Meanwhile, online payments for medical services increased by 20 per cent with more people opting for online consultations.⁴ The government's Digital India initiative, built on the back of the Aadhaar, Jan Dhan Yojana and mobile

connectivity, helped drive this rise in digital payments. On the other hand, with schools closed across the country, the online education sector expanded by 23 per cent during the first 100 days of the lockdown.⁵

For enterprises, the pandemic has brought digital strategies to the forefront of every conversation. Companies are building robust TMT infrastructure to enable remote working and investing in technologies alongside to combat cyber threats and data privacy risks emerging at these endpoints. Small and medium enterprises (SMEs) and micro, small and medium enterprises (MSMEs) that typically still lack a significant online presence and have not yet digitised their operations are likely to see the most impact from the shift to a more digitally oriented marketplace.

The government on its part has also played a critical role in augmenting the reach of TMT services across India. Summarised below are some of the key reforms undertaken:

Digital payments



- Leveraging Jan Dhan Yojana, Aadhaar and mobile to drive financial inclusion
- Government promoted initiatives such as direct benefits transfer and unified payments interface.

Infrastructure support



- National Digital Communication Policy to attract investments of USD100 billion and generate four million jobs by 2020
- National Broadband Mission to provide broadband access to all villages by 2022.
- The registration requirement for Other Service Provider(OSP) has been removed to support IT/ITeS sector in their remote working model

Digital governance



- Applications and portals such as MyGov.in, CitizenCOP and Aarogya Setu, create the base for participatory governance
- DigiLocker provides a cloud based storage service to store documents using Aadhaar.



Some of the key initiatives under Atmanirbhar Bharat Abhiyaan⁶



Production Linked Incentive (PLI) Scheme

- The incentive scheme aims to boost domestic manufacturing and attract investments
- Offers 4% to 6% of incremental sales as incentive for a period of five years
- Target segments: mobile phones and specified Electronic components



Scheme for Promotion of Manufacturing of Electronics Components and Semi-conductors

- Strengthen domestic component manufacturing ecosystem by incentivizing investment
- 25% incentive on capital expenditure, including R&D
- Envisaged to create 600,000 (direct and indirect jobs)



Electronics Manufacturing Cluster Scheme (EMC) 2.0

- Support setting up world-class infrastructure for electronics manufacturing
- 50% of project cost as grant subject to a ceiling of INR 70 Cr. (USD9.4 mn) for every 100 acres land
- Financial assistance for Common Facility Centers (CFCs) up to 75% of the project cost

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COVID-19 has brought about a fundamental shift in the way businesses operate. As a result, the TMT sector is experiencing a new wave of innovation and invention. Convergence in the role of telecom and technology companies, increase in strategic partnerships, as well as government-led initiatives, are expected to assist the industry in catering to the changing needs of the customers.



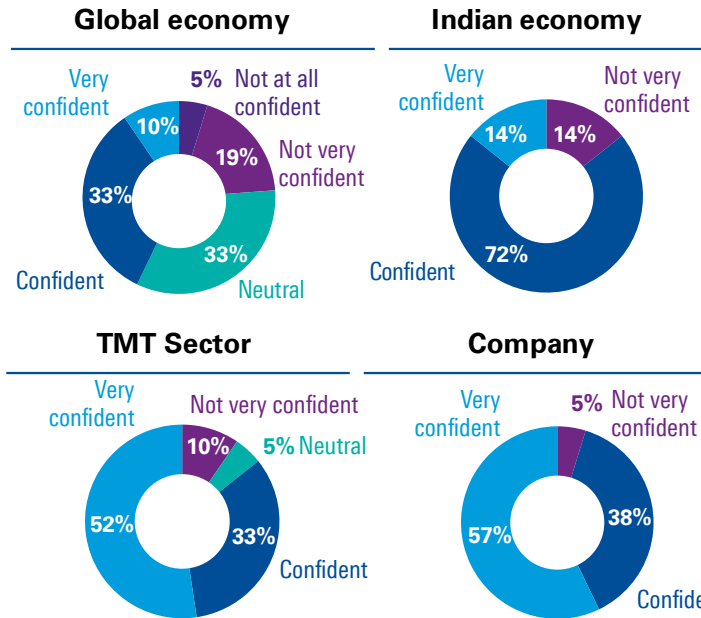
Satya Easwaran

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Survey respondent’s confidence in growth prospect of economy and industry



The resilience shown by the sector throughout the pandemic and the support shown by the government has improved confidence in the long-term growth story of the sector and is reflected in the significant investments flowing in from global technology players into the country. This confidence is also reflected in our survey findings, where TMT CEOs are encouraged by their companies’ and industry’s growth prospects.

The increased demand for TMT services and overall positive outlook is helping the industry bring in more private investments. At least 61 per cent of CEOs reported an earnings outlook of more than 10 per cent over the next three years.

However, the increased demand owing to the pandemic alone is not enough to revive the financial health of the industry. Companies are resorting to other measures such as trimming the workforce and inking strategic partnerships. TMT service providers are taking steps to enhance their resilience and evaluating discretionary spending such as marketing investments as they prepare for an extended economic downturn. Similarly, telecom operators are assessing network investments to ensure they are able to meet changes in demand and usage in an ‘always at home’ environment. There are concerted efforts to increase Average Revenue Per User (ARPU),

which are reflected in tariff hikes and appeals to the government to introduce a floor price and lower taxes.

In this evolving environment, service providers will need to make a series of strategic decisions to meet the changed customer needs, cost structures and network requirements. Telecom operators will have to rethink their business models and evolve into digital service providers to ensure that they are able to participate in the transformation their enterprise clients are embarking upon. This will not only open up alternate revenue streams but also reduce reliance on declining voice and data prices.

The government also needs to create a conducive regulatory environment in which the industry can thrive. The government and telecom operators should be encouraged to find common ground on the 5G spectrum allocation prices, such that 5G is effectively deployed at economically viable prices. The government could ease taxation measures in order to provide some support to the debt-ridden industry. Support measures on building infrastructure such as data centres, telecom towers, fiberisation etc. is critical for the growth of the TMT sector. Mutual collaboration between public and private stakeholders will help greatly in driving these technological advancements.



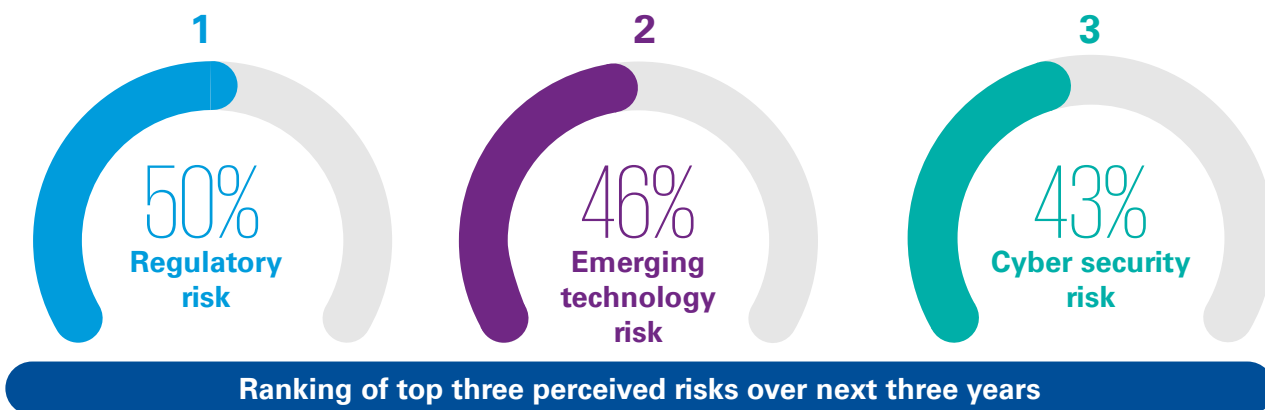
2.

Emerging risks





The COVID-19 pandemic led to the emergence of specific, historically latent, risk factors that could however pose significant challenges going forward. A massive rise in the usage of digital tools from remote locations and constantly evolving geopolitical relations have stoked fears of threats to cybersecurity and data privacy. Equally, supply chain disruptions, resulting in operational risks and regulatory restrictions could become impediments to sector's growth.



Emerging technology risk

As per the survey, CEOs are wary about the risks from emerging technology. CEOs feel pressure to maintain innovation leadership and stay ahead of the competition. Companies need to manage the risk of investing in an appropriate solution based on business strategy and market demand.

TMT players can target opportunities to leverage the start-up ecosystem of emerging technologies to create end-to-end solutions which could provide more value to businesses and minimise the risk. The government could also play a significant role by creating inclusive policies to encourage investment in companies for development of some of the emerging technology solutions.

Cyber security

Cybersecurity has always been amongst the top business risks and it has continued in that vein with the experience of the pandemic as well. Boards and audit committees have been spending significant time on better understanding this risk but the considerable pace of change on this front has only added to the complexity.



Our survey indicates that CEOs are going to invest significantly in digital platforms and collaboration tools to enhance the potential of digital channels. Establishing digital trust will be pivotal to maximising the opportunity that is being presented with rapid adoption of digital and cloud technologies.

The government has also announced the launch of a renewed National Cyber Security policy to establish a secure cyberspace in India. The Data Privacy Bill is also anticipated to provide a more controlled environment for data. TMT organisations need to build robust cyber security policies and frameworks to ensure that they are able to instil trust across stakeholders and secure data on their platforms.

TMT organisations recognise that effective cyber security is not only an obligation and an opportunity but also a risk. The urgent and increasingly sophisticated security requirements of enterprise clients and the chance to build end consumers' trust through secure applications and communications are immediate opportunities for TMT organisations to explore.

Supply chain risk

Supply chain risks in the TMT industry have increased with several nationwide lockdowns compelling manufacturing facilities to shut down. More than 83 per cent of CEOs surveyed had to rethink their global supply chain strategies due to the impact of the pandemic. An estimated 45 per cent of the CEOs surveyed attributed the supply chain

realignments to improve resilience against natural disasters.

With the realignment of global supply chains, Indian TMT players are faced with an opportunity to create a vertically integrated marketplace by bringing the global manufacturing base closer to end customers. Governments can play a critical role here by providing tax rebates and concessions. Recently, the government of India has approved a PLI scheme for ten key sectors comprising technology products, telecom and networking products.

India has an opportunity to cement its position as an attractive and reliable partner for companies looking to rebalance their manufacturing capabilities in the region. Many firms from countries

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With the convergence of various TMT sub-sectors, the security threat is expanding from cyber risk to digital risk. With the rapid adoption of digital technologies, it becomes even more critical, as more and more data and applications are coming at the forefront. Also, the boundaries across ecosystems are getting blurred, leading to rapid exchange of data and information. In order to overcome this, most of the organisations are reaching out to establish robust cyber management and data protection policies into practice to create a broader level of trust and transparency.

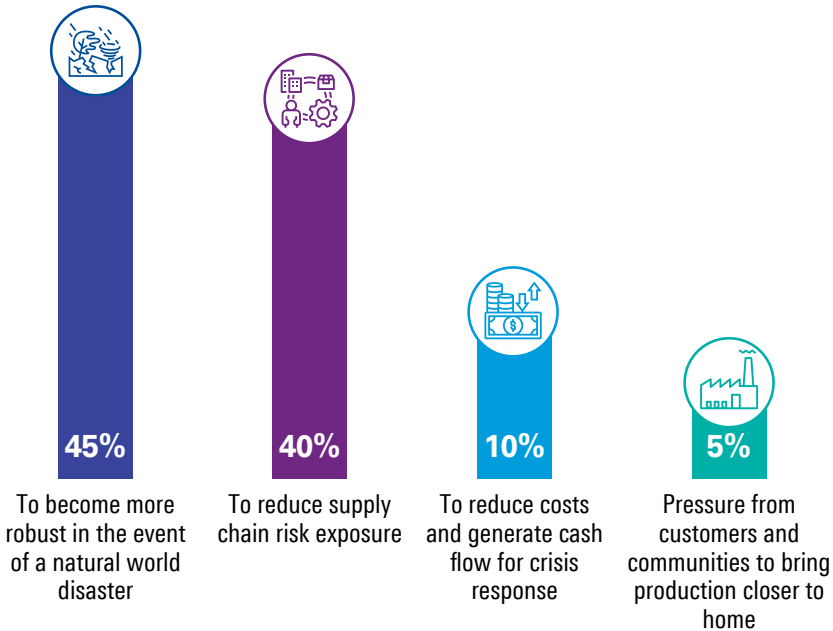


Atul Gupta
Head,
Cybersecurity,
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Reason for rethinking supply chain



including the U.S., Japan and South Korea, have already expressed interest in shifting their production facilities to India.⁷⁸ The country's large domestic market, rapidly improving logistics and digital infrastructure, vibrant private sector and supportive regulatory framework makes it a serious contender for global efficiency seeking investment, especially in manufacturing.

Regulatory and financial risks

While India is one of the biggest telecom markets in terms of subscribers, it has one of the lowest ARPU across the world. The industry has long been grappling with other issues as well including stringent spectrum allocation policies, interconnect usage charges and adjusted gross revenue. As the industry has consolidated over the recent years, it is critical for the government to provide a conducive environment wherein

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The disruption in global supply chains has created an urgent need for organisations to diversify across geographies working across enablers such as workforce availability, cost and infrastructure. For India, it is a huge opportunity to become the next manufacturing hub for global TMT giants. Between April-July 2020, India witnessed inflows worth USD20 billion and as the country deepens its integration into global supply chains, FDI inflows are likely to grow even further in the years to come. However, this would need significant support from the government in terms of policies, rebates and infrastructure.



Dipayan Ghosh
Executive Director,
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telecom operators can thrive, in light of the fact that the sector is critical for further digitalisation of the Indian economy. Some recommendations for possible government interventions include:

Area of intervention	Details
Reduction in duties and levies	<ul style="list-style-type: none"> • Reduction of Spectrum Usage Charge (SUC) charges • Abolition of USO Fund contribution and reduction in the remaining License Fee • Allowance of set-off of license fee paid on input services against license fee payable on output services • Customs duty exemption for LTE equipment required for 4G network and telecom devices • Exemption from the levy of Basic Custom Duty (BCD) should be granted on the telecom equipment to drive affordability • Rationalizing interest rates on government debt • Rationalisation of overall taxation levied on the sector including GST • The industry has accumulated unutilized input tax of about INR 35,000 crores⁹ This should be refunded immediately to enhance cash flows of the industry • Exemption from GST on spectrum payment, license fees, spectrum usage charge. Alternatively, payment of GST under reverse charge, which otherwise is required to be paid in cash, be allowed to be paid from the balance of the Input Tax Credit • Exemption from levy of service tax on “Right of Way” (RoW) services granted by the Central Government/ State Government and Development Authorities • Clarification regarding non applicability of service tax on Adjusted Gross Revenue (AGR) payable pursuant to Supreme Court judgment • GST input tax credit (ITC) on account of telecommunication towers and shelters should be available • Clarify that input tax credit (ITC) is available on critical telecom equipment installed on telecom towers.
Spectrum	<ul style="list-style-type: none"> • Identification of clear road map for availability of spectrum • Adopting long term perspective w.r.t spectrum pricing i.e. have long term benefits in mind rather than short term benefits in terms of generating revenue from auction • Set affordable pricing (Reserve Price) for spectrum auction • Availability of contiguous, interference free spectrum • Spectrum harmonization plan should be put in place by Government in consultation with TSPs & Original Equipment Manufacturers (OEMs) to support full range of future technologies including machine to machine (M2M) & IOT services. • Earmarking of bands for 5G at national level that has been identified at World Radiocommunication Conference (WRC)-2019. Also, to make India 5G ready at the earliest, Government needs to allocate at least the following spectrum per operator: <ul style="list-style-type: none"> – 3.5GHz : at least 100MHz per operator – Mm Wave (26, 28, 37 GHz): at least 400MHz per operator – Sub-GHz (600MHz & 700MHz): at least 2x20MHz per operator – E-Band: at least 2x1GHz per operator – V-Band: at least 1GHz per operator.



Area of intervention	Details
Improving backhaul	<ul style="list-style-type: none"> • Rationalisation of microwave charges • Allocation of both E & V bands for backhaul purposes.
RoW and other infrastructure related initiatives	<ul style="list-style-type: none"> • RoW policy similar to Department of Telecom (DoT) RoW gazette notification should be adopted by all the other states as well • Implementation of ROW Rules should not be seen as a revenue stream for local authorities rather should be treated as enabling infrastructure for digital and economic growth. • Positioning of telecom infrastructure on government land and building should be the preferred choice • All existing infrastructure should be regularized as per the state telecom policy aligned with RoW Rule within a stipulated period of time • Deemed approval should be obtained from the nodal authority in writing to avoid arbitrary sealing of infrastructure by the local authorities • A fast track streamlined approval process can help reduce execution challenges • There should be a pan India provision to allow TSPs and their partners to lay fiber using the existing electric poles • Mandate deployment of Common Telecom Infrastructure (CTI) while constructing all/any new highways, roads, and civil infrastructure along with that of other utilities.
Ease of doing business	<ul style="list-style-type: none"> • Review the definition of AGR prospectively as mentioned in National Digital Communications Policy (NDCP) 2018 • Single window clearance for site/tower creation for multi band / multi technology deployment • Centralized assessment by only one authority, at one location, on behalf of all 36 tax authorities is required to ease the compliance burden of tax assessment for the TSPs • SACFA approvals to be provided in time bound manner with provision of deemed approval in case of no objection being raised during this time limit • Time bound approvals for import license and other clearances. • Simplification of telecom licenses
Other matters	<ul style="list-style-type: none"> • Floor for Data Tariffs: Telecom Regulatory Authority of India (TRAI) should change the existing regulatory regime of complete forbearance in Data tariffs to protect the interest of TSPs and thus prescribe floor prices • Spectrum sharing and trading guidelines need to be further liberalized • Allow sharing of core network elements such as Mobile Switching Centre (MSC), Home Location Register (HLR), Intelligent Network (IN) etc. among the TSPs. This will reduce cost for the TSPs and facilitate faster rollout • Regime of pass-through charges for admissibility of deductions from Gross Revenue for the levy of license fees & SUC be reviewed and all kind of payments (either fixed or variable) made for any telecom input resource by one TSP (Licensee) to another TSP (Licensee) should be allowed as a deduction to the former • Additional SUC of 0.5% in case of Spectrum Sharing should be reduced.



3.

Transforming the life of a digital customer





Digital proliferation has recently seen a pivotal moment in its journey – both for enterprise and consumer. The choice is beyond the obvious. The out-break of the pandemic has led to the acceleration of digital transformation initiatives among Indian businesses. Organisations are making efforts to transform internal operations as well as fuel the growing digital shift across different industry sectors. TMT services are expected to play a pivotal role in driving the shift in digital priorities of businesses. However, this would require active participation of incumbents in the TMT industry to evolve their business models and

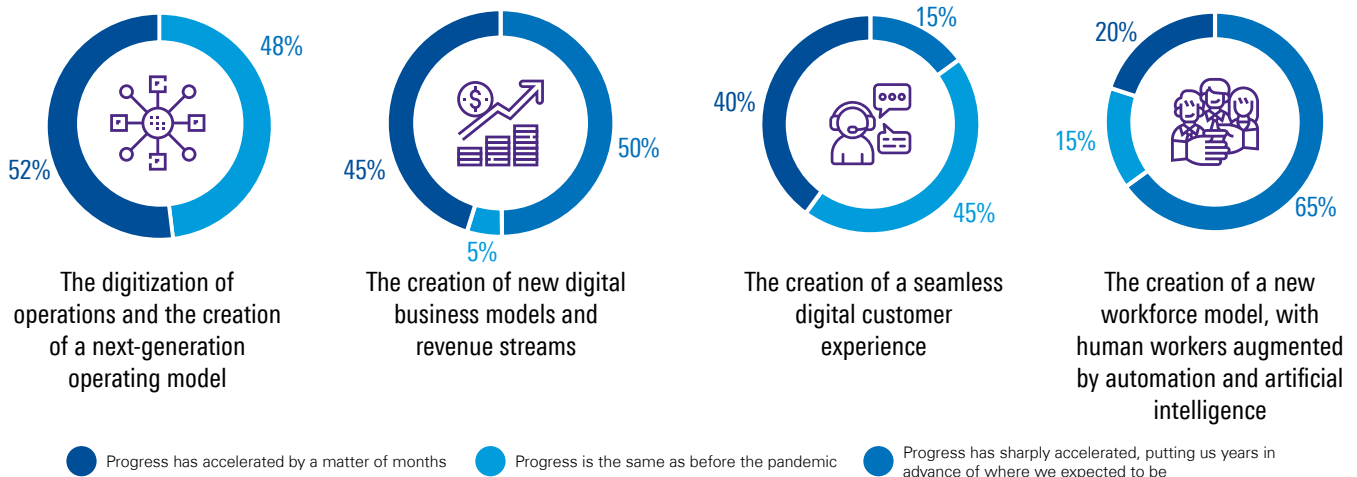
increased collaboration that will enable them to provide converged technology and communication solutions to their clients.

KPMG International had conducted a survey¹⁰ (which included India as well), in which digital acceleration has been identified as a key change aspect. Six out of ten digital transformation leaders are accelerating initiatives around connecting front, middle, and back offices and the drivers for transformation are largely customer focused. While 42 per cent have a focus to reduce and regain the loss of revenue, 33 per cent of them have also suggested to develop newer channels to serve customers. For instance, in the education sector, students and faculty have transitioned to e-learning to facilitate education in schools and

universities. Similarly, cash-based transactions have transitioned towards online payments, facilitated by fintech solutions.

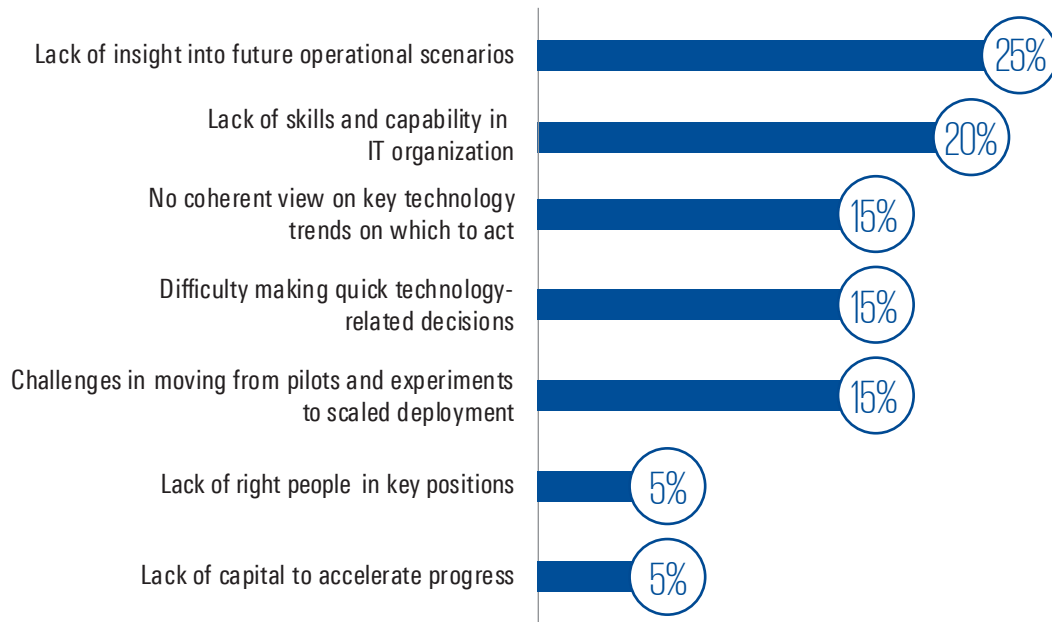
We believe that business-led, technology-enabled transformation will play a critical role in the digital transformation journey. Powered by cloud, connecting the front, middle and back-offices will necessarily drive the 'Connected Enterprise'. Rapid adoption of AI and emerging tech will be at the core of the digital transformation. The TMT sector has made significant investments on the core technology stack, but the new age companies are no more just providing siloed services but are becoming digital at their core. The services, more holistic with big integrated solutions, focus on end consumer, partners and the overall eco-system players.

Digital acceleration: Impact of pandemic on enterprise digital transformation





Challenges faced in accelerating digital transformation



Increased proliferation of digital communication channels whether because of changing consumer preferences or because of the pandemic, has resulted in organisations creating omnichannel points of sales to provide an enhanced customer experience. With retail store closures, telecom operators, handset manufacturers and technology product organisations are moving their sales and support functions online or to call centres. Insight led sales, using virtual relationship managers, is also gaining momentum as an alternate and effective sales channel.

There is a significant focus on using smarter interfaces while conducting transactions. Hyper localization has created newer business models leading to completely new journeys. Monetization using standard buy/sell models is not just the only opportunity. Loyalty is more about listening and creating earn and burn mechanisms, which have a meaningful impact on the customer persona. While grudge purchases, pent up demand have kick started the economies, but brands will have to quickly pivot and create the new experience which has to be based on micro-interactions and not just moments of truth.

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Changing customer preference towards digital channels has resulted in organisations across sectors approaching KPMG in India to create a frictionless omnichannel experience that has tangible economic value for the customer



Aditya Rath
Partner,
TMT Business Consulting,
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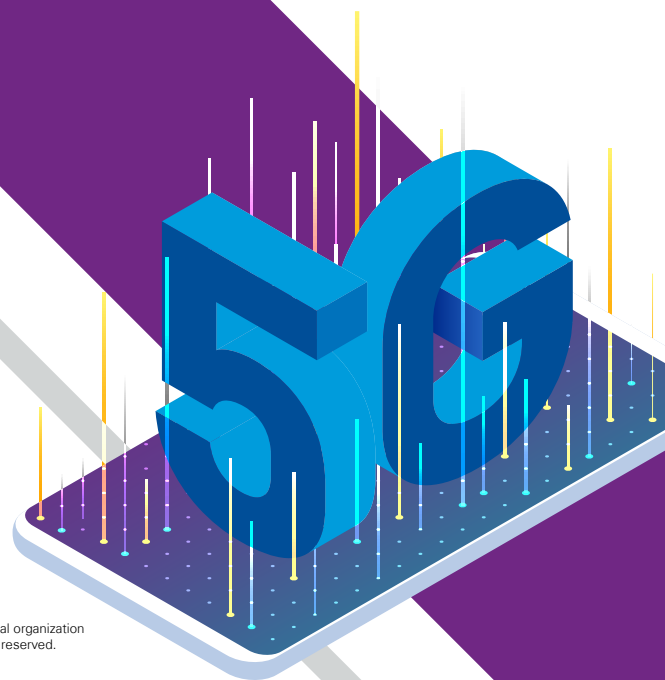
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4.

5G





The emergence of 5G is expected to increase the focus on upgrading existing technological infrastructure to support the projected increase in the number of connected devices in use. This will pave way for the development of smart-city technologies, autonomous vehicles, smart factories, 5G broadcasting, Industry 4.0 applications etc. In this context, telecom operators and IT companies have a pivotal role to play in infrastructure development and service delivery. Also, this implies that telecom operators need to work closely with IT companies to develop the required technological infrastructure.

India has the highest mobile data usage per smartphone per month.¹¹ Comparatively low prices of mobile broadband services, affordable smartphone options, and change in the viewing habits of the population are driving the increase in monthly data usage in India. Although 4G/LTE is expected to remain the dominant mobile network technology by 2025, in the context of mobile subscriptions, 5G mobile subscriptions are expected to increase to 18 per cent by 2025.¹¹ This is likely to be driven by an expected increase of nearly 410 million smartphone users in India by 2025.¹¹ Comprehensive network reach and affordability of 4G smartphones and mobile data services are expected to drive the number of 4G subscriptions, whereas growth in 5G subscriptions is expected to be accelerated by the high-speed data requirements by 2025.

In light of this, Indian telecom operators are determined to capitalise on the opportunities ushered in by the rising demand for data and 5G technology. Major telecom players are forging strategic deals with network equipment and infrastructure providers to bolster their capability to deliver 5G technology and are developing a roadmap for 5G field deployment. The vibrant start-up ecosystem is also expected to play an important role in assisting telecom operators in development of innovative solutions. Most Indian telecom operators are already engaging with start-ups via various engagement models like creation of start-up incubator. The ever-improving reach of broadband into rural areas would

result in increased participation of domestic small, medium enterprises (SMEs) and development of village level entrepreneurs. As an attempt to bring to fore and support some of these start-ups, Department of Telecom (DOT) had launched the 5G hackathon which evaluated over 400 start-ups and identified 100 start-ups which showcased unique solutions across various sectors like agriculture, education, cyber security etc. DOT will facilitate with mentorship, integration into live 5G field trials, go to market support from industry and business plan support for the top 30 unique solutions.

However, the high price of 5G spectrum, huge infrastructure investment requirements, and regulatory policy concerns are expected to impede the commercial launch of 5G in India. Major telecom companies have already expressed their inability to participate in the 5G spectrum auction with the current exorbitant rates. A task force established by the Ministry of Finance¹² has suggested that the DoT consider the financial health of telecom companies and the far-reaching impact that affordable 5G technology would have on multiple sectors of the Indian economy. A detail spectrum study by a body, consisting of both public and private participants, is necessary to understand and develop a spectrum usage roadmap for India.

Additionally, deployment of 5G technology will require significant infrastructure set up, including increased tower density and fiberisation. As a result, telecom companies in India would have to upgrade their 5G backhaul networks



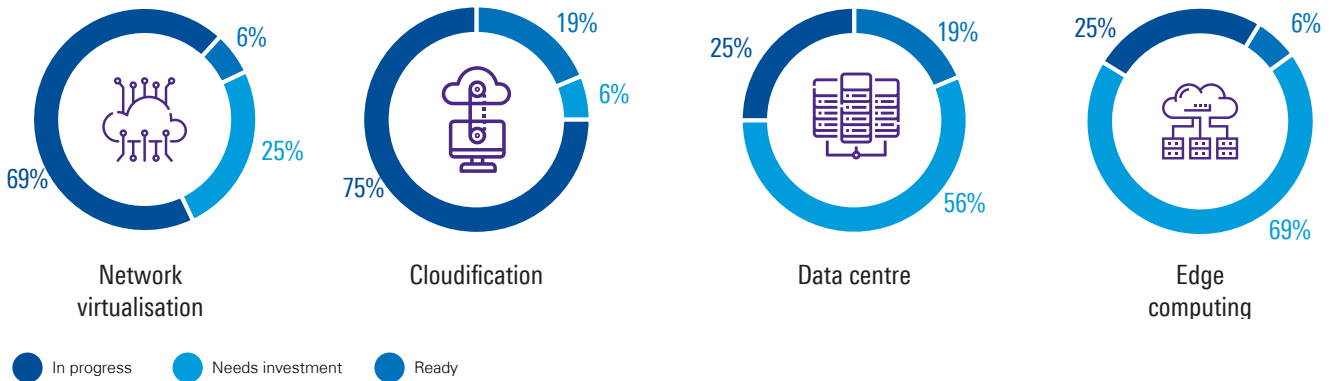
with fibre technology. According to a report published last year,¹³ the fibre kilometres per capita in India is 0.09. In comparison, fibre kilometres per capita in China is 0.87, whereas it is 1.3 in the U.S. and Japan. Similarly, as per industry estimates, India needs around one lakh additional towers in next one year to take care of the growing data and voice requirements. In addition, the advent of 5G will require network densification including macro cell and small cell deployment. This indicates a high fibre infrastructure investment requirement for the Indian telecom industry for the country to be able to solidify its global standing in 5G adoption.

Concentrated efforts are required by both government and private sector to augment the digital infrastructure. Amongst other measures, government should consider increasing the funding for New Broadband Mission(NBM), increase budgetary allocation towards digital infrastructure creation, creation of broadband focused financial instruments and providing incentives to encourage private investment.

As industrial use cases expand, a new generation of private 5G network is also expected to emerge. These private networks are physical or virtual cellular network that will be deployed for

private use by public or private entities. To fully benefit from 5G capabilities including the implementation of Ultra Reliable Low Latency Communications (URLLC) and Massive Machine Type Communications (MMTC) use cases, there is also a need for network upgrade, virtualisation and simultaneous investment in cloud and data centre infrastructure. In terms of the current preparedness, our survey results indicate that while there is an ongoing focus on network virtualisation and cloudification, there is additional investment and focus required in creating data centre infrastructure and building edge computing capabilities.

Investment status in different technologies to enable 5G adoption



Owing to the delay in the 5G auction on account of the pandemic,¹⁴ smartphone manufacturers have launched mobile devices without the support of 5G in India, whereas the same devices offer 5G support features in other countries. Further, organisations responsible for developing 5G standards have delayed the finalisation of a few 5G standards due to the pandemic.¹⁵ This is expected to

delay the commercial rollout of 5G technology and production of associated infrastructure equipment.

With the experience of COVID-19, companies are witnessing an increase in the penetration of smart devices, wireless technologies and advanced computing technologies to maintain the 'business as usual' status. These technologies require significant bandwidth to

augment decision making in near real-time. This is expected to pave the way for 5G adoption to enable applications that require low latency and high bandwidth.

According to our survey findings, industrial manufacturing, retail, and automotive are the top three industries expected to have the highest potential in terms of 5G technology adoption and number of use cases.



“

With the growing maturity of emerging technologies, such as AI, IoT, big data, edge computing etc., 5G is expected to bring about a tectonic shift in the TMT industry and present a range of economic opportunities in the next three to five years. Advancements in AI and connected device technologies are driving the need for high bandwidth support, while ensuring the performance of the underlying applications is not impacted. This is where the potential of 5G lies: in supporting high bandwidth and low latency use cases and applications thereby offering near real-time decision support to both humans and machines

**Purushothaman K G**

Partner and National Sector Leader,
Telecom,
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5G





5.

Emerging technologies

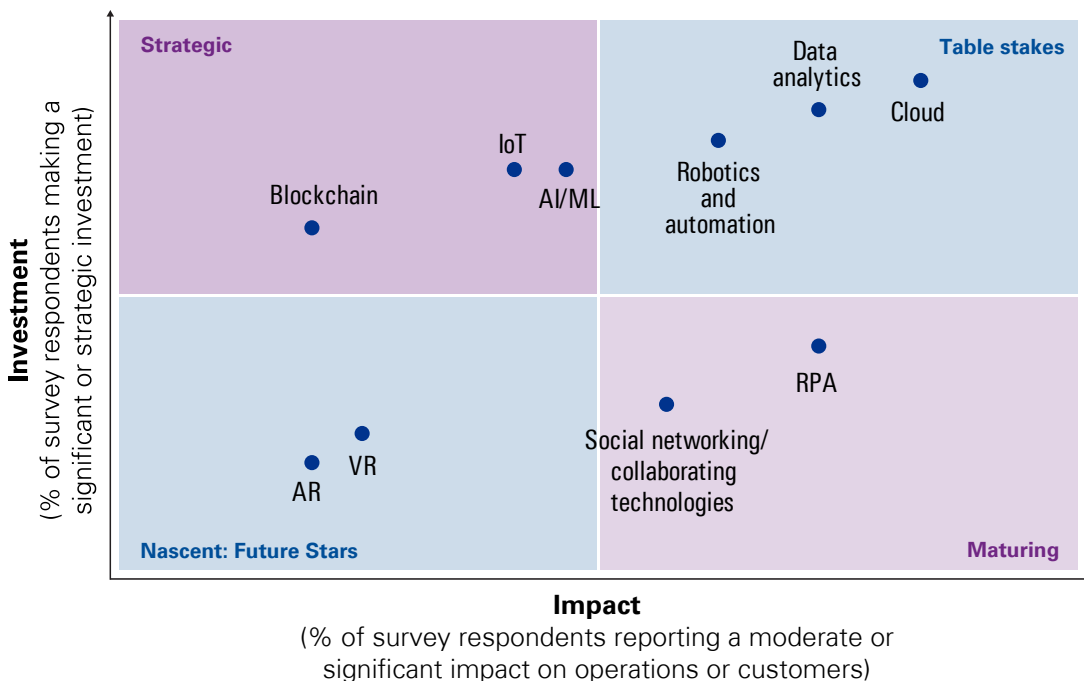




Emerging technologies assist businesses in transforming their organisations from the current to desired future digital states. With the acceleration of digital transformation initiatives across industries, enterprises have been assessing the potential of these technologies to ensure future survival while gaining a competitive edge. Incumbents in the TMT sector are partnering or developing in-house emerging technology-based solutions to assist businesses in addressing industry-specific challenges.

The digital transformation phenomenon, accelerated by the pandemic-induced need for enhanced digital capabilities, resulted in a surge in the use of emerging technologies and innovative solutions. Technologies such as AI, IoT, AR, VR, robotic process automation(RPA), big data, cloud, robotics, and blockchain are finding a variety of applications across business and operational processes. Globally, as well as in India, organisations have consciously pivoted towards emerging technology adoption. Prior to COVID-19, business objectives related to emerging technology were fragmented. However, they are now more focused on the ability of emerging technologies to drive increased revenue, achieve cost benefits, and boost customer experience.

Organisations are now focused on understanding business goals across different functions and units to seamlessly align the emerging technology strategy with overall objectives. The financial instability caused by the pandemic has forced businesses to measure emerging technology projects against performance metrics to be able to prioritise investments. Our survey evaluated ten major disruptive technologies in terms of their potential impact on operations/ business models and level of investments required. We also assessed the focus companies are placing on implementing these technologies to understand whether they are table stakes or future stars.





The survey indicated that India Inc.'s current table stakes are on technologies like data analytics and cloud. Businesses failing to embrace these technologies risk falling behind in terms of efficiency, productivity and customer experience. Respondents classified IoT and AI/ML and blockchain as strategic technologies that are starting to deliver and carry exceptional future promise. Survey respondents indicated that while RPA and social networking are two technologies that many companies

have already implemented and reaped benefits from. AR and VR are the potential future stars.

Telecom operators in India have been actively investing in upgrading their technological capabilities. To realise the benefits at a larger scale, the whole ecosystem related to the telecom industry will need to collaborate and look beyond just upgrading infrastructure. In the long run, they are expected to focus on creating newer revenue models and move beyond traditional

voice and data revenue generating business models. As a result, telecom companies are striking strategic partnerships with solution providers and system integrators to strengthen their peripheral businesses, such as cloud, IOT, analytics and platform enabled sector specific solutions.

Some of the potential areas of collaboration between technology companies and telecom operators include, though not limited to:



Cloud computing

In line with the growing need for digitisation, telecom operators are looking at providing cloud enablement services to their customers. Telecom operators are partnering with hyperscale cloud service providers to deliver differentiated products and services to customers.

Cloud infrastructure is expected to provide scalability and productivity benefits to enterprises to manage their smart devices and enable M2M communication. On similar lines, cloud SaaS products will allow operators to provide pointed solutions to support the digital ambition of its enterprise clients

Edge Computing could be one of the ways through which solution integration may be achieved. Moreover, 5G+Edge allows multiple connected devices in the network to use the common core. Heterogeneous networks can be used to help each of the connected device exchange communications with the converged cloud transport layer and the cloud native core.



IOT

IoT can be a game changer for telecom operators as it will help in strategically revisiting existing infrastructure, business models and partnerships to cater to the expected surge in connected devices in the future. The technology will help telecom operators offer integrated solutions across the value chain in different sectors. For instance, in the logistics industry, IoT-based solutions could help customers enhance the visibility of their entire fleet, monitor vehicle condition, and accordingly plan maintenance schedules.



Blockchain

The core attributes of blockchain's distributed ledger approach can help provide transparency, trust, security and control across the industrial supply chain for all points in a transaction process.



AI and ML

Historically, business processes such as network operations were performed manually, resulting in delays and errors and adversely affecting the overall customer experience. In order to minimise errors and improve customer experience, many operators are automating their business processes using AI capabilities such as machine learning, deep learning, and natural language processing. These technologies assist telecom operators in improving their customer service and service delivery via better network performance and reliability.

Telecom operators are using AI capabilities for self-optimising networks (SON), software-defined networks (SDN), and network function virtualisation (NFV), as these help enhance B2B and B2C service quality, while reducing cost of operations significantly.

Personalisation is a key pillar to providing better customer experience. AI is used to identify patterns from the viewing history of users with similar preferences. This data, refined with the help of machine learning (ML) algorithms, is used to offer personalised recommendations and keep the user engaged and loyal. Algorithms employed by OTT providers for movie and music recommendation for example, are fine-tuned using AI and ML algorithms to study individual user behaviour and demographics to come up with the appropriate recommendations.

Now AI has moved to the outer edges of networks. AI on the Edge brings the processing and computing capabilities to the embedded Internet of Things (IoT) endpoints, gateways, and other devices at the point of use. It is a real time event technology, powering everything from smartphones to smart and automated sensors. AI Edge is expected to revolutionize the market, creating wider capabilities, enabling new use cases and playing a major part in the world's move towards an era of intelligent creativity, which alongside 5G, IoT, Big Data, Industry 4.0 initiatives will be central to economic growth over the coming years.



Big data and analytics

The rapid rise in the use of smartphones and other connected mobile devices has led to a substantial increase in the volume of data flowing through telecom networks. The massive data exchange presents an opportunity for telecom operators to process, store, and extract actionable insights. On the other hand, the sudden increase in data usage across the country, due to the pandemic, is exerting pressure on the network infrastructure of the operators.

Given this scenario, telecom companies are leveraging big data to generate insights on key operational aspects and customer service usage patterns to gain more efficiency and profitability in the long run. Telecom operators could leverage these findings to predict the peak usage period and locations with an intent to optimise their network services/usage to focus on enhancing customer experience by prioritising critical locations where the traffic is high.

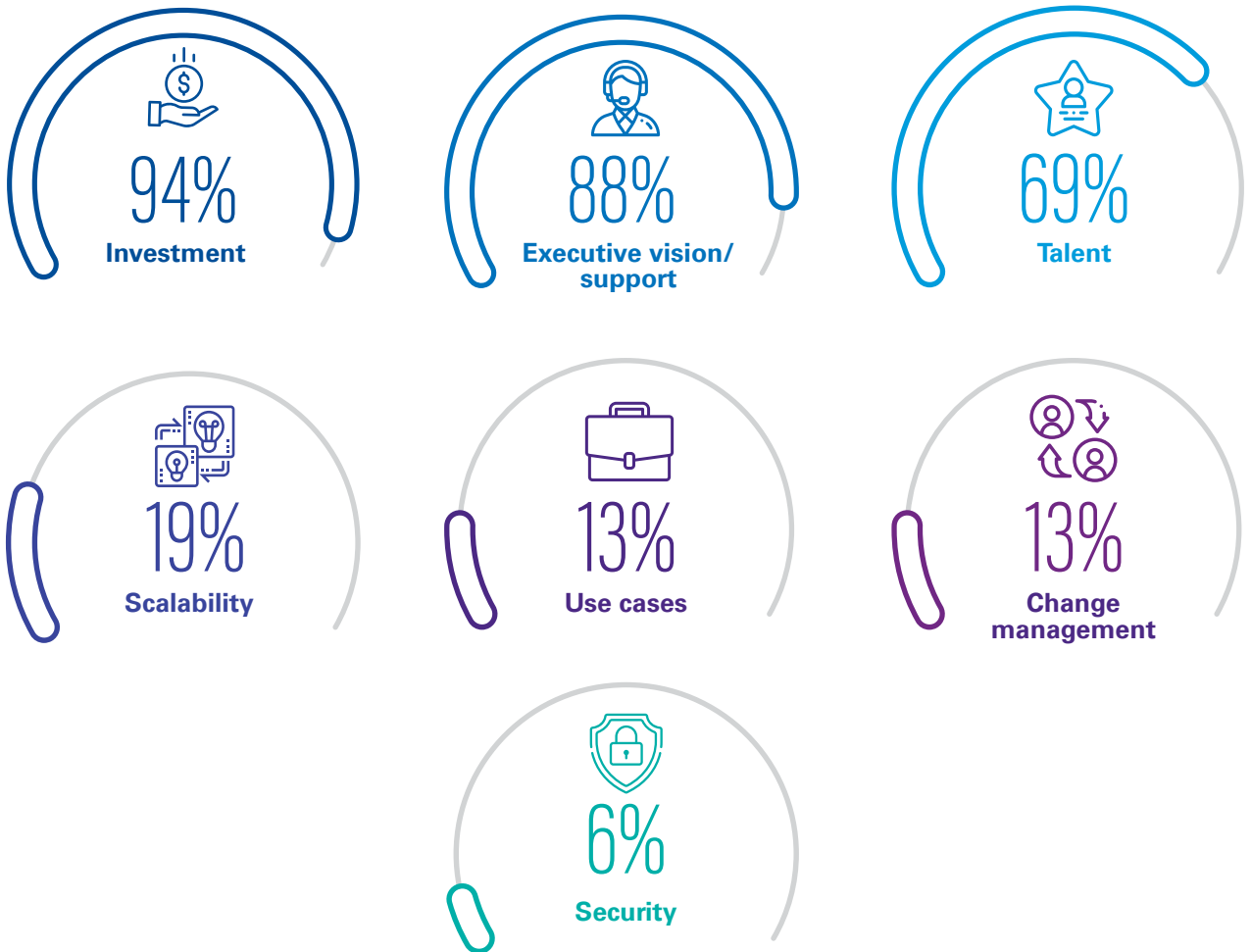


AR and VR

Telecom operators are yet to begin deploying immersive technologies such as AR and VR within their business operations at a recognisable scale. However, AR and VR have the potential to transform the industry significantly, bringing about radical changes in maintenance, business intelligence, and inventory management. Deployment of AR and VR can help simplify and speed up the overall inspection process for better maintenance and offer customers an immersive experience through AR/VR headsets. Effective usage in PR and marketing initiatives and promotional campaigns: AR/VR experiential techniques are used to make a direct, emotive connection with customers. It is believed that VR and AR also have the potential to increase empathy, which in turn could result in a deeper, more authentic connection with audiences.



Despite the perceived benefits of leveraging emerging technologies, following are some of the key challenges that businesses face while adoption and/or implementation:



*The graph indicates percentage of respondents that have categorized the aforementioned attributes under top three risks for their organisation.





Key takeaways



Economic outlook

In order to sustain the unintended but welcome impetus to the TMT sector from the pandemic, companies need to transform their business models and develop significant – not incremental – new revenue streams. Organisations need to significantly invest in infrastructure and technological advancements, supplemented by adequate government support. Alongside, the government needs to swiftly implement recent schemes and provide more transparency to boost market confidence.



Transforming the life of a digital customer

Businesses everywhere require a new array of technology solutions to optimise business processes, enhance supply chain visibility and anticipate bottlenecks. In response, the TMT sector needs to evolve their business models and engage in active collaboration to provide converged technology and communication solutions to customers. As the TMT organisations themselves refocus on driving digital transformation, they also need to adapt to the evolving digital first customer behaviour to deliver enhanced customer experience and drive value.



Emerging risks

Major risk factors impeding the growth of TMT sector are related to cybersecurity, supply chain, regulatory, financial stress and emerging technologies. Supply chain uncertainty has impacted companies across the world forcing a rethink of global production network design. The current environment presents an opportunity for India to showcase itself as a promising alternative manufacturing hub for global players. The risk emanating from the pace of disruption caused by emerging technologies is a concern, but at the same time maintaining the current state and not adopting these technologies is no longer an option. Cyber security threats due to continuous remote working need to be handled with robust risk management policies. This would be critical in supporting regulatory requirements and building customer trust. Also, the long pending financial and regulatory hurdles need to be resolved with a collaborative approach between the government and private players.

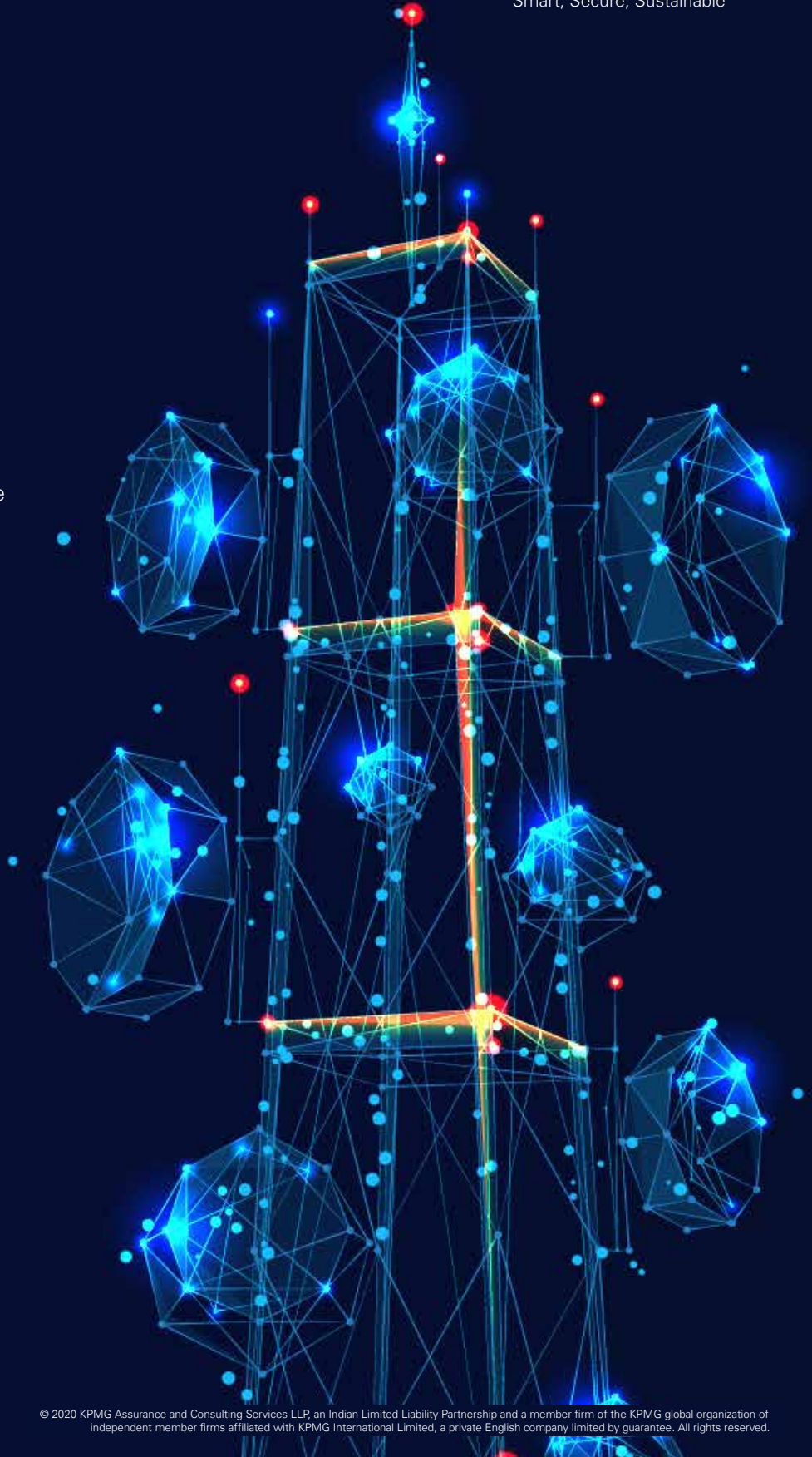


Given the current financial instability of the telecom industry in India, telecom operators need to adopt ways to trim their high capital expenditure by undertaking infrastructure sharing and leasing activities. Due to an increase in the penetration of smart devices, wireless technologies and advanced computing technologies across industries, telecom companies would have to closely align with IT companies to develop the required technological infrastructure. While telecom players have a continued focus on network virtualisation and cloudification, additional investment would be required to enhance their data centre management and edge computing capabilities. These upgrades would assist them in enabling the use cases and applications that require low latency and high bandwidth.



Other emerging technologies

Emerging technologies provide an array of solutions to remould business and operating models across industries. However, enterprises will need to assess the relevance of emerging technology projects against performance metrics to prioritise future investments.



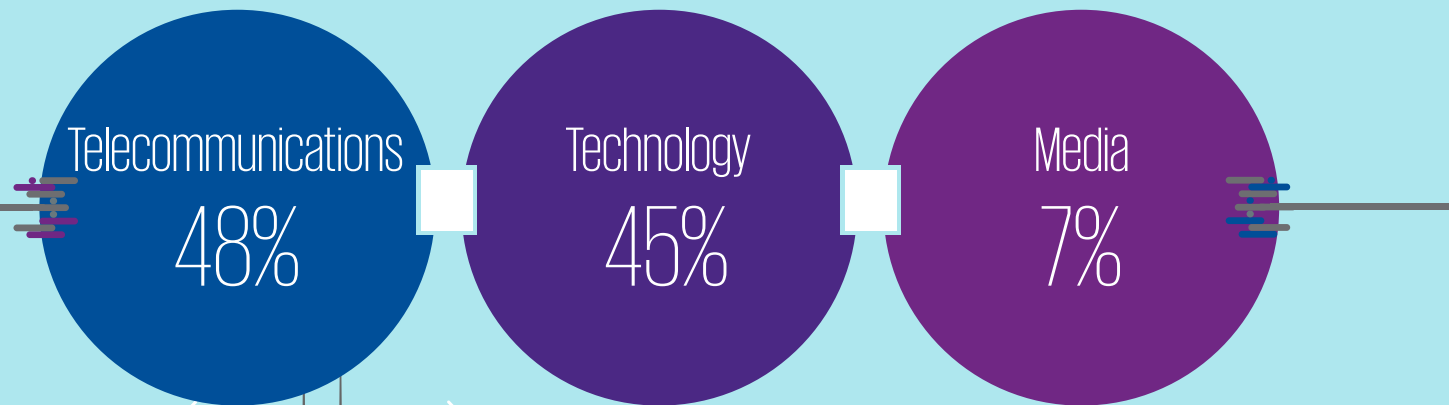


Methodology

The IMC KPMG CEO Survey provides an in-depth outlook from CEOs in India on enterprise and economic growth in Telecommunications, Media and Technology sector. The survey offers a unique perspective on the mindset shift of CEOs in India in the new normal.

More than 300 CEOs from India were reached out through this survey. Executives from fortune 500 companies to start-ups participated in the survey conducted in the month of November 2020.

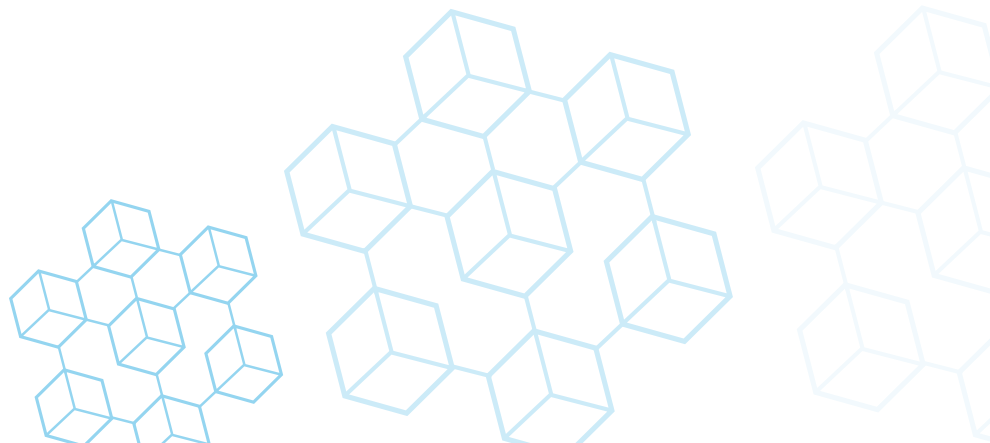
Sector-wise profile of survey respondents





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Glossary

4G	Fourth generation
5G	Fifth generation
AGR	Adjusted Gross Revenue
AI	Artificial Intelligence
AR	Augmented Reality
ARPU	Average Revenue Per User
BCD	Basic Custom Duty
CEO	Chief Executive Officer
COAI	Cellular Operators Association of India
COVID-19	Corona virus disease 2019
CTI	Common Telecom Infrastructure
DOT	Department of Telecom
EMC 2.0	Electronics Manufacturing Cluster Scheme
GB	Gigabyte
GST	Goods and Services Tax
HLR	Home Location Register
IMC	India Mobile Congress
IN	Intelligent Network
INR	Indian Rupee
IoT	Internet of Things
IT	Information Technology
ITC	Input Tax Credit
LTE	Long Term Evolution
M2M	Machine to Machine
ML	Machine Learning



MMTC	Massive Machine Type Communications
MSC	Mobile Switching Centre
MSMEs	Micro, Small and Medium Enterprises
NBM	National Broadband Mission
NDCP	National Digital Communications Policy
OEM	Original Equipment Manufacturers
OSP	Other Service Provider
PLI	Production linked Incentive scheme
PR	Public Relations
RoW	Right of Way
RPA	Robotic Process Automation
SACFA	Standing Advisory Committee for Frequency Allocation(India)
SMEs	Small and Medium Enterprises
SPECS	Scheme for Promotion of Manufacturing of Electronics Components and Semi-conductors
SUC	Spectrum Usage Charge
TMT	Telecommunications, Media and Technology
TRAI	Telecom Regulatory Authority of India
TSP	Telecom Service Providers
URLLC	Ultra Reliable Low Latency Communications
USD	United States Dollar
USOF	Universal Service Obligation Fund
VoLTE	Voice over Long Term Evolution
VR	Virtual Reality
WRC	World Radiocommunication Conference



Acknowledgements

We would like to acknowledge the core team from KPMG in India who worked extensively in preparation of this report:

- Satya Easwaran
- Purushothaman K G
- Aditya Rath
- Atul Gupta
- Dipayan Ghosh
- Sonica Bajaj
- Rahul Hakeem
- Sangeetha Ramachander
- Amit Balachandra
- Shivam Awasthi
- Sanjna Dhingra
- Mukta Gupta
- Tanuj Parashar
- Tijel Mahendru
- Abhijith A
- Gulnaz Hashmi
- Sameer Hattangadi
- Satyam Nagwekar
- Aashruti Kak
- Arjun Kariyal
- Raahul Gautam
- Rahil Uppal

Acknowledgements from COAI:

- Lt. Gen. Dr SP Kochhar - Director General
- Vikram Tiwathia - Deputy Director General
- Cmde Dr.J.Jena (Retd) - Deputy Director General
- Saurabh Puri - Sr. Director
- Gopal Mittal - Sr. Director
- Vertika Misra - Sr. Director
- Amrita Kaushik - Assistant Director
- Kshem Kapoor - Assistant Director
- Anandhi Nair - Deputy Manager
- Manisha Chawla - Manager
- Nishi Singh - Deputy Manager
- Deepa Ahya - Senior Executive
- Mukesh Kumar - Advisor

Acknowledgements from IMC:

- P. Ramakrishna - CEO
- Malini Rao - Program Director
- Shreyance Modi - Finance Director
- Rahul Kumar - Senior Manager, Sales & Marketing
- MA Sudhakaran - Senior Manager, Govt. Relations
- Nabil Syed - Manager, Branding & Communications
- Garima Sharma - Manager, Programs
- Vipul Garg - Assistant Manager, Finance
- Ankita Raheja - Senior Associate, Sales & Marketing
- Rohit Batra - Senior Graphic Designer
- Sonali Pandey - Senior Associate, Social Media & Design
- Gulshan Kanojia - Senior Executive, Finance & HR



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