



CIO INSIGHTS

Leading Technology Trends

The COVID pandemic laid bare the many vulnerabilities of businesses around the globe. Some organizations were able to adapt quickly, moving their brick-and-mortar operations online and ramping up their digital-first strategies while many others struggled to pivot.

The resilience and innovative spirit of the Indian professionals across the spectrum once again demonstrated their capability in enabling the businesses sail through such crises and build their digital capabilities for future growth. The Digital India mission provided a strong foundation for business of all sizes across the sectors to step up their digital journey.

As organizations navigate their business through the Digital journey, they face multiple challenges, and seek a trustworthy platform for handholding. To help organizations, especially the MSMEs, leverage the rapid technology changes, Confederation of Indian Industry (CII) has created the Centre for Digital Transformation (CDT) in partnership with Tata Communications. The fast-tracked ecosystem has forced every company to be a technology company first, irrespective of the industry or core mission. CDT is proud to have played a modest role in catalyzing the rapid transformation to some extent.

Simultaneously developments are happening across all major/emerging technology areas – AI, IoT, Cybersecurity, Blockchain, Metaverse, Big Data Analytics, 5G etc. which are important components of India's journey to become the \$ 5 trillion economy, in India's decade!

As we at CII CDT studied the Digital Transformation journeys of companies across multiple industry segments, traditional to emerging to the new age industries, we found that technology has been used in different formats with diverse innovative approaches and sometimes different technologies have been used quite uniquely even in the same sector by different players. We felt that it was important to showcase such achievements and recognize these leaders.

CII CDT decided to honour these achievers and acknowledge their efforts by instituting CIO Excellence Awards. We got a very encouraging response in this first edition with 125 very strong entries being nominated. To ensure objectivity, CII CDT collaborated with the global consulting firm, Protiviti, as the Technical Partner, who brought in lot of expertise and rigor for the evaluation of the awards.

Each of the application underwent a detailed scrutiny by the respective Subject matter experts which was followed by shortlisting of nominations by the steering committee and final assessment by the jury. We were fortunate to have a stellar jury comprising of Dr Gulshan Rai, Former National Cybersecurity Coordinator Director General CERT-in Dr Kiran Karnik, Author, Columnist, Former President – NASSCOM; Ms Aruna Sundarajan, Former Secretary Telecom, GoI and Sunil Chandiramani, Chairman - Sapphire Foods, Founder & CEO NYKA Advisory Services.

The expertise of the jury was extremely valuable during the award assessment process. After detailed evaluation over days, the jury was on crossroads on many occasions to choose between entries. Their insights, observations as well as time, for which they were very forthcoming with, has ensured fair and right selection across the categories of these Awards.

This edition of CIO insights is the collation of trends shared by the CIO community across sectors and technology areas during their interactions and deliberations as part of the awards program that have been summarized by Protiviti SMEs.

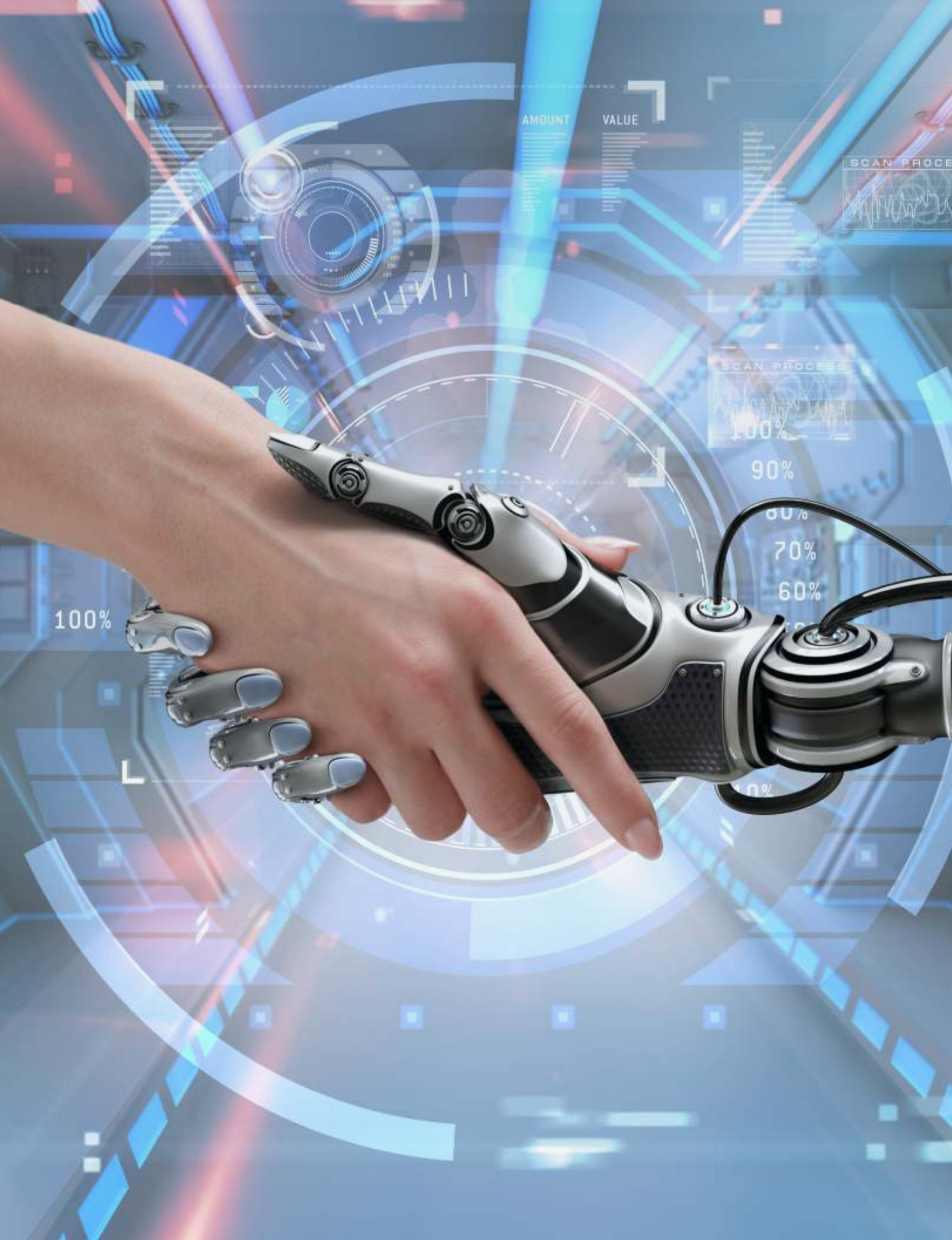
I thank all the stakeholders for helping build this Awards initiative and strongly believe that it will encourage more participation in years to come.

Vijay K. Thadani

Chairman of the Jury, Co-Chairman of CDT
Vice Chairman and Managing Director – NIIT

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AMOUNT

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SCAN PROCESS

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80%

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10%

100%

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Introduction

The role of the CIO has had a significant shift over the last few decades. Today's CIOs are often the key decision-makers in the C-suite and central to driving business strategy within their organization. A major responsibility for the CIOs is to stay on top of the technology trends that can create a competitive advantage. CIO's today are leveraging new age technology options such as cloud computing, digital, automation, wireless communications, big-data analytics, and mobile devices that enable them to develop strategies that keep their businesses competitive in a fast-changing global marketplace.

Single Technology Vision – CIOs are working to establish a single technology vision. This entails a significant change management in how organizations have dealt with acquisitions and multiple business groups and have used improvisation and innovations to manage the technology stack for improving business performance.

Gen-next Technology Services – CIO's are adopting a variety of promising technologies. These include Industry 4.0, prescriptive and predictive analytics, IoT, metaverse and Web 3.0, and so on. It is observed that almost all organizations are running multiple, simultaneous initiatives on the future state of technology services, ranging from those which drive operational efficiencies to emerging domains such as the metaverse environment. These new technologies provide the CIOs with options for revenue maximization and opportunities for better customer experiences and drive cost optimization for the business.

Business Model Transformation – Traditional organizations are changing their workplace strategies to ensure survival in the digital era. Competing with the “born digital” organizations has become a top priority for the boards and C-suite leaders. Business leaders across the globe are most concerned about their company's ability to transform their operations and infrastructure, so that they can compete with organizations that are “born digital”. These transformational strategies are being led by the CIOs.

Digital Collaboration Culture – The COVID pandemic drove organizations towards the adoption of new work-from-home practices on a massive scale worldwide. Even as many employees return to their offices, CIOs are playing a growing role in supporting hybrid work environments that span home, office, and distributed workers.

We hope this publication will be useful to understand the wave of transformations across industries and various technology domains and assist the business leaders and the CIO community to benefit from the leading practices of their peers in their sectors or across thematic areas by integrating them in their own Tech Strategy at play.

Sandeep Gupta
Managing Director – Technology Consulting
Protiviti Member Firm for India





Organizations across the financial services industry are facing demanding customer expectations to deliver seamless and uninterrupted services juxtaposed with rising cost pressures and regulatory scrutiny. The industry has been a great catalyst for the

transformational adoption of digital, analytics and governance. Market leaders in the sector will continue to drive disruptive innovation into the future with their visionary ideas, used cases and thought leadership.

Key Trends

Compliance for growth: There is a gradual shift seen amongst business leaders, where compliance is seen as a Growth-agenda rather than a Control-Agenda. Reg-Tech or Compliance-Tech powered by Data Governance continues to enable this transformation.

Integrated Biz-Tech Transformation: Successfully led by Fin-tech as a concept, the industry is rapidly trying to adapt to other tech-led or digital-first business models that bring technology and digital innovations embedded within the core business functions such as; Insur-Tech, Reg-Tech, Assur-Tech, Risk-tech, Ops-Tech, etc. Responsible AI, Machine Learning models and Robotics Process Automation is leading this space.

Cloud adoption: Post-pandemic there is a surge in cloud adoption in the sector and the trend is certainly going to

continue with cloud data platforms and multi-cloud/hybrid-cloud strategies and business use cases.

Blockchain (with or without Crypto): While the hype or debate around its viability is expected to continue for some more time, organisations are already embracing this technology for a much wider and strategic use-cases beyond reconciliation, trade settlements and transaction monitoring.

Financial inclusion & increased rural penetration: There is an emergence of more rural fintech players as they continue to bring the large untapped customer base within the financial transaction customer network. Digital Currency, BNPL (Buy-Now-Pay-Later), Real-time money transfer and other innovative payment modernization techniques are evolving and transforming customer expectations.

“ BFSI as a sector has often led the way in adoption of digital & technology innovations and embedding them as transformed business model such as FinTech. We certainly see this trend to continue in future covering areas of data, analytics, digital, cyber security, governance, and cloud. The growth in the sector is driven by leaders who are effectively collaborating with the ecosystem partners and building an environment of transparency, integrity, and trust.

- Amit Lundia, Protiviti

Conclusion

Digitization, automation, analytics and governance will continue to play a crucial role in the growth of the financial services sector. In the aftermath of the COVID pandemic, the sector has seen a decent recovery and the focus is back on disruptive business model adoption leveraging business partnerships among ecosystem

players. CIOs are already looking to drive many innovations in the sector, leveraging technology and enabling huge business benefits by way of increased customer value, trust, digitized customer experience, reduced compliance costs and improved operational efficiencies.



Consumer Products

The COVID pandemic accelerated the shift to online purchasing in the consumer products industry. The multiple waves of lockdowns and closure of retail outlets amplified the competition for grabbing and retaining

shoppers' attention as they demanded more convenience and innovation. Major Consumer Products and Retail brands continue to devise new ways of connecting with customers through emerging tech adoption.

Key Trends

D2C (Direct-to-Consumer) Technologies: comes with the advantage of being more agile and resilient, enabling the generation of stable profits in an uncertain environment. They offer a lower cost of entry and a reduced cost of maintaining channels. Brands have moved towards direct-to-consumer platforms to capitalize on the surge in e-commerce and online ordering.

Driving innovation with robotics: Businesses are heavily investing in robotics for warehouse and factory automation. Manufacturers are also beginning to understand their role, extending beyond warehousing to the entire supply chain.

Connected Packaging/ RFID/ Serialized QR Codes: With serialized QR codes and connected packaging, companies are connecting with their customers in newer ways to drive awareness about their products. I.e., when a

customer scans a serialized QR code, they get deeper information that includes ingredients batch, packaging, routing, authenticity, etc.

Widespread adoption of low code no code platforms: There is greater enterprise adoption of low-code and no-code software to significantly improve the end customer's experience. With low-code, no-code platforms, companies are able to innovate faster, validate new ideas and address consumer needs in real time. These platforms will give businesses the speed and agility required to respond quickly to queries and deliver customized experiences.

Continued growth in AI usage: The level of connectivity across networks is becoming more difficult for consumers and businesses to manage. Whether for surveillance, communication, data protection or managing other interactions, AI has become the preferred option for safely managing the complexity of these requirements.

“Consumer technology trends are developing faster than we can imagine. With the advent of blockchain, NFTs, and crypto, the paradigm shift of consumer goods to an alternate virtual world will happen sooner than later. Some of these ideas are underway, while others are already up and running.”

- Ankit Gupta, Protiviti

Conclusion

Brands that remain agile and on the pulse of the market trends will prove to be the successful ones that can weather the disruptions and stay ahead of the competition. Consumer industry trends like robotics, AI

& ML, Big Data, etc. shall transform the sector as we know it today. It is vital that organizations identify new opportunities in emerging technologies and drive early adoption in their businesses.



Energy & Utilities

Most Energy and Utility organizations are undergoing transformation across their entire value chain. Factors such as COVID, climate change, oil prices, and a disruptive workforce have contributed to accelerating such changes. It includes adopting new operating models, functional transformation, and strategies enabling positive societal impact among others.

One of the key enablers for such programs is the adoption of digital technologies such as Cloud, Analytics, Mobility, Smart Meters, IoT, OT convergence, AI, ML, AR / VR, Metaverse and others. The objective is to drive growth, efficiency, sustainability and most importantly have a positive impact on society.

Key Trends

Manage programs effectively: Transformation programs should be managed in an effective manner with clear objectives, goals, timelines and resources. An effective program combining industry expertise, technology and a risk-based approach will steer success.

Manage digital solutions: Consider the EV industry where digital solutions is the backbone and any vulnerability in the value chain could lead to a potential disaster. IoTs at production floors, convergence of OTs, use of drones for surveys, vehicles with internet connectivity, etc. are prone to various threats. Such technologies, if exploited for vulnerabilities can shut-down a plant, control vehicles, or lead to ransomware. Embedding continuous security assessment processes within the business operations enables growth, sustenance and resilience.

Manage work locations: Gartner survey says going forward more than 48% of the workforce are expected to work remotely. This significantly shifts the focus of threat assessment towards edge devices and the weakest link (personnel). Implementing security solutions such as DLP, Biometrics, MDM, IAM, Cloud-based Security Monitoring and Response has increased more in the last two years than over the last decade. CISOs are feathered with security transformation roles in a world with a mobile workforce.

Monitor newer threats: COP26 has put pressure on organisations to support climate change regulations. Large organisations are using orchestration platforms combining IoT, ML, AR, Predictive Analytics and others to identify, analyse and monitor their assets towards such compliance requirements. An appropriate ESG strategy combined with leading technologies offers a competitive advantage in the global market.

“*Innovations have a positive impact but often comes with challenges. Those who are able to balance the risk and impact are successful in their journey towards growth and sustainability.*”

- Kalyanaraman K, Protiviti

Conclusion

Organizations that embed an enterprise-wide risk assessment model and culture with an effective program governance structure to embrace digital technologies are at the forefront of the industry when compared to peers.

Needless to say, organizations should have a mechanism to continuously monitor the rising threats and vulnerabilities with an eye towards ESG compliance.



Healthcare & Lifesciences



The technology evolution in the healthcare industry ranges from IoMT and big data and analytics, artificial intelligence and machine learning to telemedicine and secure storage of clinical data. These solutions are

increasingly enhancing operational workflows and providing connected infrastructure, devices, and systems to accelerate efficient and accurate clinical services.

Key Trends

Artificial intelligence and big data analytics: AI is being widely adopted in this industry. Applications such as - examining patient information, test data, improving diagnostic procedure effectiveness and the ability to develop new medications are redefining medical practices and procedures. Medical service providers are now looking at modern applications and platforms to analyze and manage huge volumes of distributed data. The result of Big Data and analytics is enhancing predictive analytics and optimizing patient diagnostics and treatment procedures.

Internet of Medical Things (IoMT): This sector has witnessed unprecedented growth in IoMT in the last few years and is projected to continue a similar trend in the

coming years. Devices such as smart wearables, robotic arms for surgical procedures, etc. shall augment operational efficiency and business metrics across medical fields and specializations.

Securing healthcare data: There are large volumes of digital data and IoT devices exposed to the Internet. Consequently, securing systems storing Electronic Health Records through cyber security measures such as patching vulnerabilities, periodic updates, and penetration testing exercises on end user systems continue to be one of the primary objectives in the sector.

“*Healthcare sector is poised for a major technological shift with rapid adoption of emerging technologies like artificial intelligence, AR, and big data analytics. In the coming years, we are set to witness highly efficient ways of predictive analytics in patient diagnostics and medical treatment procedures.*”

- Vaibhav Koul, Protiviti

Conclusion

Over the recent years, we have seen faster adoption of technology with the COVID pandemic.

Healthcare industry trends like robotics, AI & ML, Big Data etc. shall transform the sector as we know it today. Business metrics and cost optimization will continue to

be the primary drivers for higher adoption of new technology practices. It is vital that organizations recognize new opportunities across technologies to leverage growth.



Manufacturing

Industry 4.0 has now been driving the manufacturing sector to embrace advancements in technology across its value chain. Digital transformation in manufacturing is not just interconnected machines and intelligent automation, it's about integrating an organization's vertical and horizontal business value chains, embracing new ways of working with suppliers and customers, and creating innovative products and services.

Key technologies that have been at the forefront of enabling the transformation in Industrial Manufacturing include IoT, AI / Machine Learning, smart manufacturing, 3D Printing, Collaborative Robots (Cobots), Cloud Computing, Cloud ERP, Digital Twins, AR/VR, etc.

Key Trends

New business models: Companies are now able to establish digitally connected value-chains right from shop floors to the marketplace. This in turn has allowed companies to accelerate the innovation process and launch new products and services faster to the market.

Data driven business: Harnessing vast volumes of data not just from shop floors equipment but also across the entire supply chain is enabling manufacturing companies to take data driven decisions. This has resulted in better forecasting, product planning, inventory management, predictive maintenance, etc.

Customer engagement and experience: Creating an exceptional customer experience irrespective of B2B or B2C business model is critical for Industrial manufacturing companies. Businesses need to have a better understanding of how customers are using and interacting with their products.

Smart products: Digitalization of the product itself is an important trend as Industrial manufacturing companies look to introduce smart products which have a software layer that is not directly related to the physical or mechanical aspects of the product.

“*CIOs in the manufacturing industry are at the forefront of the digital revolution and must embrace emerging technologies to drive efficiency and cost levers as well as new business models for the organization. Managing change will be critical in this transformation journey.*”

- Anand Jena, Protiviti

Conclusion

Industrial manufacturers need to adopt a phased approach to embracing digital revolution. Understanding what is best for an organization and keeping a fine balance between technology, efficiency, and costs, is critical before embarking upon their digital journey.

Leading manufacturing organizations have already embarked on the journey focusing on digitalizing the core first and gradually moving towards integration of the value chain and leveraging emerging technologies to explore newer business models with innovative products and services.



Media & Entertainment



The media and entertainment industry can be broadly categorized into print, TV, OTT, Gaming, Films, VFX, audio and digital. Each of these sub-industries are at a different level of maturity and growth trajectory. Their transformation journeys are very distinct from one another. While in some cases SLAs and uptime are of higher importance, in others digitization of content or creating a customer experience (AR/ VR/ Metaverse) is more important.

Key Trends

Data & AI: The usage of data for business intelligence decision making have now reached a level of maturity. Organizations have started using AI/ ML algorithms, video, and image analytics to understand customer preference, for pricing their products and for driving operational efficiency.

Investment in AR/ VR: The global AR/ VR market is set to grow 4x by 2030 and the industry has started using them to redefine their customer's experience. As per a 2022 BCG & CII report on M&E industry metaverse is expected to enable a \$10Bn+ opportunity for the Indian M&E industry. Creating an immersive experience in the

Since the introduction of internet in the 1990s and the introduction of 5G and other new technologies, making an online presence for all business is becoming a need. We see the same reflecting itself in the media industry and see exceptional growth for digital media as more people consume content online.

metaverse for the content we watch will become more of a norm than an exception.

Digital media: As more people consume content online, print media houses have started to digitize a lot of their content and make them available over mobile applications. Outreach to a larger customer base and ability to monitor their consumption pattern is also changing how the media houses are generating content.

Automation: Most organizations in this sector have already started to use process automation (RPA/ BPM/ Workflow) to automate the mundane tasks.

“As an industry which thrives on customer experience, we will continue to see more investments as well as adoption in the metaverse and NFTs across all subcategories in this sector.

- Dhruabrata Ghosh, Protiviti

Conclusion

As an industry which thrives on customer experience, the people will continue to see more investments as well as adoption in the metaverse and NFTs across all subcategories in this sector. We will also start seeing content creation being more personalized as basis the

taste of people and making this content available across a broader base of people through digital platforms. Some of the organizations have started on this journey while others are joining-in to transform the industry.



Real Estate & Infra

The sector is under pressure due to the conflict between the demand for top notch infrastructure in the shortest possible time and the need for compliance with environmental and governance regulations, rising resource and labour costs as well as other critical factors. To meet the needs of the customers, the real estate industry is witnessing a paradigm change, where it

inevitably must transform itself with increased use of digital technologies to meet customer expectations.

From the use of drone technology, IoT, to giving customers a glimpse of the future of housing through metaverse and digital twins, industry players are fast adopting new business models with tech embedded in the value chain.

Key Trends

Drones & IoT: Drones are used to take areal images of properties; in certain areas like vacant plots or difficult to reach spaces, drone footage are used for studying the landscape. IoTs and sensors are reshaping the real estate sector through use cases like smart homes.

3D AR landscaping / 3D Imaging and VR experience: Potential buyers can get a real feel through augmented reality designs even when the real properties are not yet constructed.

Digitization: The buying process is now made paperless with the entire workflow of choosing a property, signing of contract, application, sanctioning and disbursement of loans to final ownership is already starting to gain momentum.

Data Analytics & AI: Ability for the organizations to take a more data driven approach towards decision making by building data lakes and real time dashboards. This data is made available anytime anywhere on any device today.

Digital twins & Metaverse: This helps the buyers get a perspective of the property they are likely to buy and helps in the entire selection/ buying process. Today, not just the location or the look and feel of the property but a guided tour of the property through digital assistants are revolutionizing the entire real estate buying process.

“ *The advancement of technology has forced the real estate sector to shake off the inertia and fast forwarded it to endless new opportunities, transforming the sector at its core.*

- Debarshi Dutta, Protiviti

Conclusion

Some sections of the industry are relatively new in terms of adoption and are still undergoing change management needed to set up the foundation for advanced analytics. However, there are the new age change makers who have come with a completely new

mindset and are transforming the sector ground up with digital transformation. The industry is yet to see successful implementation of many of these advanced technologies and their impact across the industry.



Information Technology

Information Technology (IT) companies are at the forefront of assisting their clients in their business transformation. During the outbreak of COVID, IT companies themselves had to adapt and transform, to enable their teams to adapt quickly to serve their clients in a contactless world tomorrow. High demand for IT

talent led to massive hiring and onboarding teams all virtually supported.

Embracing the new technologies helped IT companies to reduce costs, enhance customer experiences, and increase profits.

Key Trends

Talent transformation: For any IT company what becomes essential is identifying the manpower with the appropriate skillset. In this competitive era, enterprises are utilizing more and more cutting-edge technology to improve the way they identify, onboard, and sustain the talent in order to achieve maximum productivity and better customer engagements.

Cyber security: IT companies deal with clients across multiple industries, businesses and with such varied services that protecting the client's data becomes most critical. Organizations are taking multiple initiatives to

ensure this and building a robust defense mechanism against any potential cyber-attack.

BOT's enabled employee services: Human interference in today's competitive digital age is fast becoming obsolete, especially when Artificial Intelligence (AI) and Machine Learning are taking over the technological world. Today's professional service organizations need futuristic approach to ensure that continuous support is provided to the team at large serving their respective client.

“ *Technology is like a consistent change, the ones who adopt become winners. A new ingredient to consume every day to have a better tomorrow.*

- Ankit Sharma, Protiviti

Conclusion

The future will see the global economy's re-emergence and the same shall be driven by new technologies. For any organization to serve its client the two most important aspects shall always be people and technology.

The top technology trends will keep on evolving and the early movers will have the advantage of going a step ahead and making difference for their clients and employees.



Cloud Computing

Cloud Computing has advanced from the stage of on-demand infra provisioning to leading the digital technology adoption and transformation. Speed, efficiency, reliability, and security have become the de facto benefits to be realized by shifting to Cloud.

Key Trends

Push towards Hybrid and Multi Cloud: Businesses are taking advantage of the best features, capabilities, and services offered by cloud providers through a multi cloud strategy. Additionally, they are maximizing value from existing technology investments by adopting hybrid cloud models.

Data Analytics/ Big-Data: Storing and analyzing huge volumes of data through data analytics solutions on cloud continues to rise. Enterprises are adopting data lakes on cloud and leveraging the benefit of Data Analytics as a Service (DAaaS) offered on cloud.

AI and Machine Learning: Instead of building their own AI/ ML infrastructure and solutions, enterprises are seizing the opportunity to create AI/ ML solutions on the cloud. Businesses are creating customized products/ services, developing new solutions, or leveraging

The transformation agenda and the need to stay ahead of the curve is being pushed further due to emerging technologies such as AI/ ML, 5G, Metaverse, Augmented Reality, and Edge Computing.

analytics to monetise assets through cloud-based AI/ML solutions.

ESG: As more and more corporations are pushing towards more stringent ESG goals, IT is supporting the business through cloud adoption. Developers, technical teams, and IT Operations are evaluating the current carbon footprint and are reducing the footprint by adopting the best of breed solutions.

IOT/ 5G Edge Computing: Continued expansion of the Internet of Things and 5G networks is leading to development of solutions based on edge computing architectures. Combining 5G connectivity with edge computing, cloud storage and AI/ ML modelling is enabling enterprises to offer the best possible services that are faster and better than anything customers have experienced earlier.

“ *Technology is enabling the businesses for digital transformation and making them future ready. Cloud has empowered businesses to create platforms for innovation and value that can be rapidly delivered. Businesses are able to offer the best products, services and unique customer experiences.*

- Shanmukha Polepeddi, Protiviti

Conclusion

The power of cloud has allowed organizations to innovate, transform, become more responsive and agile in meeting real-time business needs. Combined with advanced analytics, AI and ML along with container services, organizations have expanded their capabilities and enabled the digital transformation of businesses,

achieved cost savings, and improved operational efficiencies. It is imperative for businesses to adopt emerging technologies such as IoT, 5G, Metaverse, Augmented Reality, and Edge Computing to stay ahead of the competition in their industry segments.



Cyber Security & Privacy

During and post-pandemic, we have witnessed a massive shift towards digital adoption across sectors. This has led to an increased attack surface for malicious actors and created the need for enhanced cyber defense.

Key Trends

'Crown Jewel' identification and periodic assessments: Emphasis on identification of critical systems/ data, to plan the protection measures and performing periodic assessments with a focus on detailed technical assessments such as red/ purple teaming, SOC assessments and IAM reviews is increasing.

Zero-trust architecture: Reinforcing zero-trust architecture within their IT infrastructure as newer threats emerge in the digital ecosystem. This shall include multi-factor authentication and securing data using multiple authentications to reinforce digital vaults.

Adoption of security products and technologies: such as MFA, DLP, DRM, EDR, SOAR and IAM/PAM in addition to the existing reliance on traditional perimeter and end point security products is seen.

Securing the cloud: has gained increased focus as critical data is consistently stored on the cloud and the adoption has been accelerated.

Data privacy and protection: Apart from performing privacy risk assessments, organizations are implementing privacy management platforms to manage data privacy on an ongoing basis.

Regulatory compliance: requirements are regularly updated. The CIOs see a need to work with the business teams to define a cost-efficient approach to complying

Organizations are focusing on having effective and sustainable preventive, detective, monitoring and response controls accordingly.

with the rules while balancing costs against value derived through the compliance.

Third-party risk management: Third-party risk reviews can be tedious, the CIOs are helping business teams to rank vendors as per risk tiers and only high/ medium-risk vendors undergo comprehensive reviews compared to third parties in a low-risk tier.

Awareness: using traditional methods is being supplemented using tools/ techniques of war games/ phishing simulations.

Budgets: swell post a breach and regress during incident free times, leading to difficulties in getting the budgets for stout defenses. Effective CIO, and business relationships help address the challenge by leveraging spending benchmarks, reviewing current allocations and quantifying risks.

Vulnerability management: SOC, incident response and forensic readiness are attracting investments with the objective of reducing response times. Integration of vulnerability management and SOC setups is also an emerging trend.

Cyber insurance: Ensuring optimized insurance to cover the critical systems and operations is now seen as imperative.

“An integrated view of the preventive, detective and response measures greatly provides visibility to CIOs for effectively planning the budgets to maintain sustainable defenses.”

- Vaibhav Koul, Protiviti

Conclusion

While organizations continue the journey of digital transformation, it is critical to ensure that the processes and technology implementations are secure by design. An integrated approach of the protective, detective and

response measures that are discussed above is critical for leaders to succeed in effectively protecting the organization.



Data & Analytics

CIOs are playing a critical role in transforming business using automation and data analytics.

Insight-driven companies not only manage data effectively, but also break down data silos and hidden

Key Trends

Data as a strategic asset: Organisations need to treat data as a strategic asset and protect customers/ employees/ non-owned data as a data custodian or a data treasurer. Few of the GICs, fintech and digital native organizations are really doing this well.

Building a culture of transparency and trust: Customers, investors, regulators, and business partners are all looking for a trusted business environment driven by data. A significant surge of investments is seen in the areas of data lineage and data traceability programs. Knowledge Graph technologies are seeing huge traction in driving contextual lineage and relationships for data citizens.

Edge Computing and Quantum Computing: With accelerating market demand and constant need for faster data processing, the focus is rapidly shifting towards

risks to identify untapped opportunities. The result is a competitive advantage that enables them to make intelligent business decisions that drive performance and growth while managing risks.

edge computing and quantum computing. Even though it may go through a few iterations before successful adoption, it is there to stay as an integral part of the business processes.

360-degree Decision Intelligence: Decision intelligence is the new trend that combines artificial intelligence, customer intelligence and business intelligence together to engineer real-time business decisions. We have seen market leaders, consistently using augmented decision intelligence for solving complex business problems & policy decisions.

Data as a service and data governance by design: As more businesses move towards cloud-enabled and digital-first technologies, there is a strong push towards providing data and insights as a service model (DaaS or Iaas).

“Organisations are embracing disruption through data analytics and driving value for business. Emerging concepts of data fabrics, data mesh, data democratization, data literacy, data ethics, etc. are being adopted at a large scale. Data exchange platforms enabled through secured governance & data privacy mechanism are seeing traction. Data Leaders are already acting as an evangelist for business growth and driving stakeholder's trust in data.

- Amit Lundia, Protiviti

Conclusion

Organizations are assessing their maturity in data analytics and clearly articulating their value proposition, which includes revenue uplift, risk reduction, cost optimization and profit maximization. The leaders have also realized that the adoption of data platforms and advanced analytical techniques requires new skills that

are in short supply. Data Analytics has become a Board agenda already and CIOs/ CDOs are defining ownership and accountability of data with businesses and using innovative solutions like gamification for driving user-adoption and change management.



Digital Transformation



In today's world, organisations are changing how they leverage technology to improve performance and innovate new business models. This transformation is also very people centric and affects every element of the

business, including sales, marketing, operations and customer service. Operationalizing this change in an effective manner is the most practical definition of Digital Transformation.

Key Trends

Everything as a Service (XaaS): is one of the biggest DX trends that continues to gain traction. There is a broad category of services related to cloud computing and remote access, such as software as a service (SaaS), platform as a service (PaaS), infrastructure as a service (IaaS), communications as a service (CaaS), network as a service (NaaS), healthcare as a service (HaaS), transport as a service (TaaS) and so on. Primary advantages of XaaS include Flexibility, Cost Savings, Better Security, Faster Implementations and Changes, Accessibility, Scalability, Easier Innovation, etc.

Total Experience (TE): is a combination of all Customer and Employee channels, including digital (e.g. website and mobile app) and physical (e.g. retail stores and call centres), into a single channel with a consistent experience. To provide a great total experience, businesses need to have a deep understanding of their customers and their needs and use digital technologies like AI/ ML, AR, etc. to personalize their products and services.

Customer Experience (CX): With digital transformation approaches such as instant service, seamless omnichannel experience and constant online availability, enterprises are now bringing their customers closer. They are doing so by enabling personalized digital customer experience, consistent customer journey via seamless multi-channel, consistent customer experience and keeping the customer updated.

Solutions for hybrid and remote work: Organizations are working on adopting solutions and technologies that seamlessly enable collaboration regardless of location. Businesses will leverage Digital transformation tools to manage work and coordinate with teams and stakeholders that are globally dispersed across various industries.

Industry 4.0: combines traditional manufacturing processes with new integrated technology that aims to mitigate inefficiencies and bring more control and agility. This fourth industrial revolution will transform how businesses operate and benefit the customer. More production houses are moving towards Internet of things (IoT), robotics, AI and machine learning.

“*Digital Transformation is no more a buzzword or a choice for the C-Suite of any organization. It has become imperative for all organizations to embrace Digital transformation to continue to be relevant in business. A decision that the C-Suite need to make is around prioritizing the areas of focus and speed of transformation.*”

- Deepak Chawla, Protiviti

Conclusion

Adoption of technology is incidental to the DX journey and is primarily driven by the business requirement of the units in conjunction with the overall strategy of the organisation. Most businesses have already embarked on this journey and have reached different stages of maturity, while others are catching up fast. Presently,

the focus is to increase the innovation quotient and thereby improve the overall value proposition. Business and technology leaders today, are evaluating the effectiveness of their digital transformation journey by analysing its tangible and intangible impact on business.



Emerging Technologies

Adoption of niche concepts such as augmented reality, nanotechnology, blockchain, and the internet of things has led to more applications of these technologies to both new and existing products and services.

Adoption of emerging tech by some of the traditional businesses such as large-scale manufacturing hubs to born digital businesses like e-commerce is leading a revolution of ideas, that till some time back looked unimaginative.

Key Trends

Big Data, predictive analytics, artificial intelligence (AI) and the Internet of Things (IoT) have transformed business operations. To help understand their customers and make strategic decisions, companies are learning new ways of collecting, exchanging, and using data.

Augmented Reality and Virtual Reality: has been witnessing large scale deployments across business verticals in the recent past, especially after the COVID pandemic. One of the prominent use-case is the Learning & Development segment. There is also increased deployments of this technology by EdTech, Manufacturing, Healthcare, Retail, Media & Entertainment and other verticals.

Blockchain: Smart contracts on blockchain have the potential to streamline business processes and a lot of business and IT leaders are looking at the potential use cases, such as in the areas of advertising, supply chain, healthcare and citizen services.

Entrepreneurship: Emerging technologies are playing a big role in the growth of entrepreneurship across the country. Many start-ups are using cutting-edge technologies to solve problems and create innovative products and services.

“Emerging technologies such as artificial intelligence (AI), machine learning (ML), augmented reality (AR), the Internet of Things (IoT) and quantum computing will help organizations bring innovation to the front, improve efficiency and resiliency, minimize cost, ensure security of the systems, and deploy solutions rapidly.

- Deepak Chawla, Protiviti

Conclusion

While adoption of certain key emerging technologies like AI, IoT and Big Data have become the norm, there is a huge excitement amongst industry leaders to explore novel areas of augmented reality, 3-D printing, and

nano & quantum technology. Leaders are exploring use cases to bring real business value to their organizations by utilizing the power of emerging tech.





Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government, and civil society through working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for Industry.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. The premier business association has around 9000 members, from the private as well as public sectors, and an indirect membership of over 300,000 enterprises from around 286 national and regional sectoral industry bodies.

With 62 offices, including 10 Centres of Excellence in India, and 8 overseas offices in Australia, Egypt, Germany, Indonesia, Singapore, UAE, UK, and USA, as well as institutional partnerships with 350 counterpart organizations in 133 countries, CII serves as a reference point for Indian Industry and the international business community.

Confederation of Indian Industry

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CII-TATA COMMUNICATIONS
CENTRE FOR
DIGITAL TRANSFORMATION

As organizations navigate their business through Digital Transformation (DX), they face multiple challenges, and seek a platform of trust to handhold their digital journey. To help organizations leverage the technology changes, Confederation of Indian Industry (CII) has created a focused Centre for Digital Transformation (CDT). The centre operates with Tata Communications as principal partner and other Industry members.

CDT aims to emerge as leading authority in guiding and enabling organizations to building intelligent systems and help in personal computing, cloud and reinventing their productivity and business processes. Vision is to be a Centre of international repute that provides role model products and services for continuous betterment of organizations, industries and society through digital transformation. Ultimate goal is to evolve and leverage a Digital Transformation Movement that transforms India and make Indian industry globally competitive.

The CDT plays a pioneering role in introducing latest concepts in DX and establish systems of intelligence. The services include Assessment & Advisory, Technology seminars, Awards, Best Practices, Training & Development, Cyber Security, Technology Missions, etc.

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About Protiviti

Protiviti (www.protiviti.com) is a global consulting firm that delivers deep expertise, objective insights, a tailored approach, and unparalleled collaboration to help leaders confidently face the future. Protiviti and its independent and locally owned Member Firms provide clients with consulting and managed solutions in finance, technology, operations, data, digital, legal, governance, risk and internal audit through its network of more than 85 offices in over 25 countries.

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