Azadi Ka Amrit Mahotsav

FICCI

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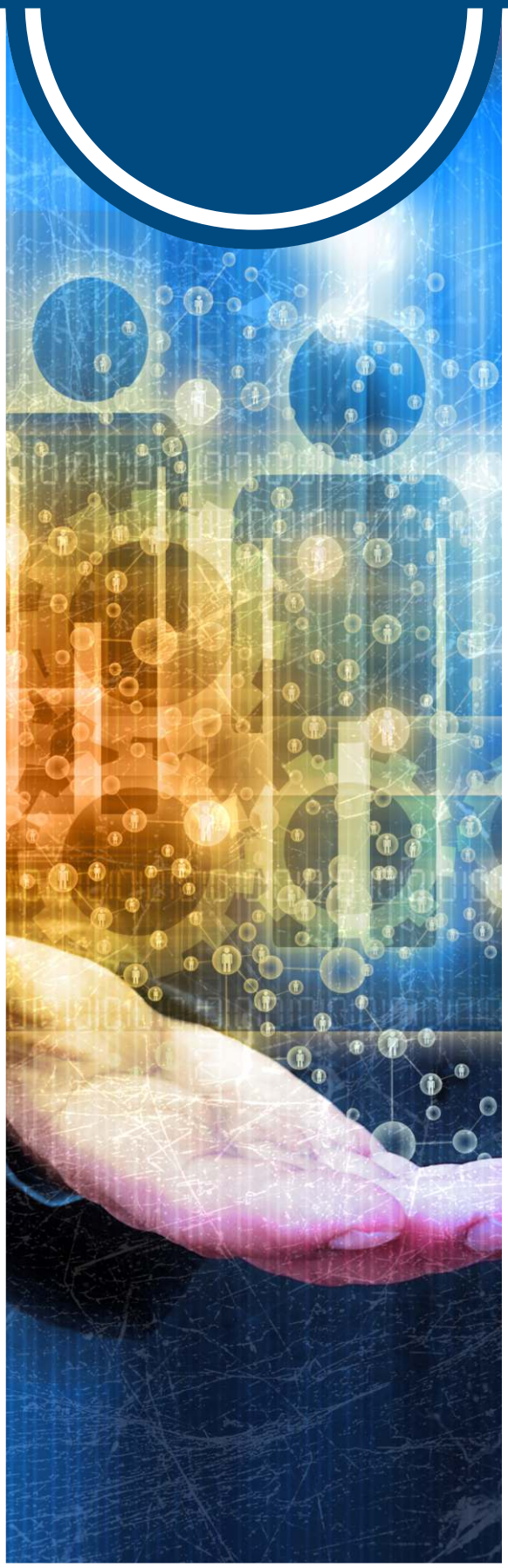
October 2022

INDUSTRY 4.0

5G for the Next Level of Industry 4.0



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Foreword

5G, the next generation of digital communication, has the potential to effect major societal transformation by enabling massive expansion in the deployment of information communication technology across industrial, commercial, financial, agriculture, education, health and other social sectors. 5G is set to change the way businesses operate and people live, work and play. It will serve as a springboard for dramatic evolution of businesses, as it enables a virtually unlimited number of things to be connected. Digital connections will also become broader and faster, providing a platform for every industry to boost its productivity and innovation. This connected world will be well-equipped to deploy state-of-the-art technologies, such as AI, AR/VR, cloud, Edge, IoT, robotics etc.

In order to become a significant source of innovation and technology for meeting global requirements, India needs to ensure early, efficient and pervasive deployment of 5G networks. It also needs to leverage 5G technology for inclusive development, by harnessing its potential for the benefit of remote and rural areas and economically and socially weaker sections of society. To enable such harnessing, mobile broadband should continue to be at the heart of India's policy vision. The 5G Triangle of enhanced Mobile Broadband, massive Machine Type Communications and Ultra Reliable Low Latency Communications will enable higher speed and bandwidth, coverage and availability, and low communication delay. These will help faster achievement of the goals of a rapidly digitalising India.

With the inauguration of 5G services by our Prime Minister, India has set in motion the process for this technological revolution. The 5G testbed initiative launched in India as a collaborative exercise between multiple institutions will facilitate industry majors and start-ups alike to test and authenticate the performance of their products in India. The true value of 5G across manufacturing operations centres around its influence to optimise and empower data across applications including Industrial Internet of Things (IIoT).

5G has been designed for global adoption with flexibility to support wide number of applications. Its adoption in India will involve many use cases adopted widely in the world, but also some unique applications to suit India's needs. 5G may offer opportunities for India to leapfrog by providing smart infrastructure that offers lower cost and faster delivery of infrastructure. The optimal data rate and minimal latency delivered by 5G will boost the functionality and performance of many connected devices and machines, such as robots, drones, driver-less vehicles, smart displays, home appliances, and devices with smart sensors. Setting up of private captive networks will spur a new wave of innovations in Industry 4.0 applications, such as machine-to-machine communications, Internet of Things (IoT) and Artificial Intelligence (AI), across automotive, healthcare, agriculture, energy and other sectors.

The 5G communication standards enable highly reliable, secure and high-speed data transmission with short response times, making manufacturing more flexible, mobile and productive. Therefore, 5G forms an essential prerequisite for the factory of the future. 5G will enable use of robotics for precision manufacturing, particularly where human beings cannot perform these functions safely or with the necessary precision.

I am happy to learn that FICCI through its initiative is creating awareness about such technical knowhow and new edge technologies to create a world-class digital ecosystem and make India one of the leading countries in 5G technology.

(Amit Agrawal)

New Delhi
19th October 2022

Industrial 5G for The Industry of Tomorrow

MESSAGE BY

Mr. Suprakash Chaudhuri
Chairman, FICCI Industry 4.0 Committee and Executive Vice president & Country head, Digital Industries, Siemens Ltd.

Manufacturing companies around the world are under extreme competitive pressure due to shorter business and product lifecycles. To compete globally, Industrial companies must constantly improve their processes and find innovative ways to respond quickly to changing market requirements. New applications like Industrial Edge, remote diagnostics and maintenance, autonomous machines, intralogistics, and Augmented Reality applications for service technicians promise major potential in this area. Leveraging cyber-physical systems and striving towards ever more automation and autonomous decisions in environments such as smart factories, autonomous vehicles, smart buildings, smart cities, and connected industrial applications, requires substantial resources to deal with the resulting amount of data that needs to be gathered, analysed, and transferred. The success of these applications depends on extremely reliable wireless broadband communication with the lowest possible latencies.

Thanks to reliable, powerful broadband transmission with massive machine connectivity and ultra-low latencies, Industrial 5G is the response to a need for end-to-end wireless networking of production, maintenance, and logistics, ensuring a significant improvement in efficiency and greater flexibility in industrial added value.

What makes 5G "Industrial" 5G?

For most of us, the attraction of 5G for smartphone users is obvious: For example, it allows us to watch 4K videos wherever we want. But it is far more important for industry. It is a milestone on the path to Industry 4.0, in which smart factories become more flexible and productive thanks to end-to-end digitalization and the Internet of Things. Industrial 5G is 10 to 20 times faster than today's broadband technologies such as LTE and consumes much lesser amount of energy per bit transferred.

Reliability and ultra-low latency are the most important factors for industrial applications. That is why industrial customers will choose a different focus when setting up their 5G networks. Because of these different focuses, we get two different demand profiles: Public vs. industrial.

Industrial 5G,

- needs to meet the demands of industrial applications.
- is based on Release 16 (or later) of the wireless standard* that supports the URLLC scenario.
- runs on hardware designed for industrial environments that differ from consumer-based applications.

- is run in a local private network and supports industrial protocols (OPC UA, PROFINET, Safety, etc.).

Depending on the application, not all four of these aspects may be satisfied. For remote access via mobile wireless 5G networks, for example, Release 16 or a local private network are not essential. However, in order to operate a mobile robot, however, all four aspects must be covered.

Both Public and Private spectrum must be established worldwide

Unlike many consumer applications where the focus mostly is on high data rates, Industrial networks tend to focus more on low latency and high availability. This is where private 5G networks step in, which can be configured to suit these requirements. Private 5G networks also offer data security: In a self-managed network, the data stays within the company, and the owner can decide which data is processed where. In a Private 5G to achieve the URLLC it is of prime importance that the 5G core remains in the OT environment, this thus also ensures privacy and data integrity for critical applications.

Hence it is also important that the private spectrum for local applications be established on the path to industrial 5G, because only then can 5G-based technologies be successfully used in industry worldwide.

The benefits of private networks are obvious. Companies can track, store, analyze, control, and flexibly configure data traffic at their discretion. This allows them to guarantee the speed and reliability that their processes – all their logistics and production sequences – require.

In addition to the need for local wireless connectivity, there is increasing demand for remote access to machines and plants. In these cases, communication is usually over long distances. Public mobile networks can be used to access devices that are located at a considerable distance, for example in other countries. In addition, service technicians can connect to the machines they need to service via the mobile network while on the go. Hence Public 5G networks are also an essential element of remote access and remote servicing solutions. They can be used, for example, to provide users with very high bandwidths in urban areas with small radio cells and high frequencies. In rural areas, radio cells have to cover a large area, which is why lower frequencies are used. Particularly at the edges of radio cells, for example for LTE or UMTS, there are often significant losses in terms of both the bandwidth and stability of the communication connection. And it is exactly in these remote areas where stable bandwidth transmission is required for remote servicing or video transmission, for example for water stations. With innovative 5G communications technologies, considerably more bandwidth with greater reliability is available at the edges of radio cells and the average data rate for users within a radio cell increases.

Where are we in terms of 5G deployment?

German companies like Siemens, Audi, Mercedes-Benz, and BASF, are already investing in 5G. The foundations for industrial 5G networks are also being laid elsewhere.

Over the next few years, private 5G wireless networks will be set up at industrial sites wherever companies need robust, ultrafast networks with high bandwidth. From automated racking systems and production lines to augmented reality and robots, the new mobile communication standard will control hundreds of thousands of devices per square kilometer in real-time.

It is only a matter of time until 5G will establish itself in the industry. The flexibility of 5G with its different implementation approaches – private and/or public – makes this standard the most versatile mobile communications solution for achieving the true potential of Industry 4.0. Solutions previously not feasible are now within reach, and applications no one dared to think about can be realized in the near future.

'Increased Efficiency with 5G- Integrating Machines with servers'

MESSAGE BY

Mr. Rajeev Singh
Co-Chairman, FICCI Industry 4.0 Committee and Partner Management Consulting, Deloitte Touche Tohmatsu India LLP

With vast improvement in network characteristics, 5G will act as a digital transformation catalyst for enterprises. The new architecture and technology advancements that 5G brings, like low latency and high speed, makes it suitable for time sensitive IoT applications. Additionally, the built-in redundancy enables the network to run even during emergencies.

The ultra-fast speed of 5G will support a variety of IoT use cases, both in public and private 5G networks. Few application areas are listed for clarity:

- Connected car network: Technologies like 5G will propel us into the era of connected and autonomous vehicles. According to the United States Department of Transportation, 94% of all car accidents are the result of human mistake. Mechanical failure is just the cause of 2% of accidents. Further analysis of the data reveals that speeding is a factor in one out of every four fatalities. Connected vehicles can prevent such accidents and will be a gamechanger in increasing the safety on our roads
- Smart electricity grid automation: 5G will enable our electricity grids to become smarter and more efficient. 5G will enable intelligent feeder automation, millisecond level load control for communication networks and make the distributed power supplies and low voltage distribution systems smarter
- Collaborative robotics: 5G will drive the growth of industrial robotics by making these robots faster, more efficient and enable wireless communication between robots and robots to the server

While public 5G networks will bring blazing fast data connectivity to machines in the field, restricted or private 5G networks will be the bedrock of communication in confined areas. Private 5G network will bring in improved and reliable connectivity, faster data rates with lower latency, greater scalability, security, and network control than previous communications technologies. Private 5G networks are also suitable for deployment in industrial environments enabling private captive networks to integrate 5G and develop smart factories of the future.

We expect to witness an accelerated 5G infrastructure deployment serving both urban and rural India. This development will boost smartphone penetration and provide a new dimension to India's digital revolution leading to the adoption of advanced technologies across industries. The growth of 5G will also strengthen India's digital ecosystem and offer global vendors and networks huge opportunities to provide technical expertise.

This FICCI newsletter examines the benefits of 5G for Indian Enterprises and Solution Providers in

context of their Industry 4.0 preparedness. I hope this newsletter will help the industry understand how they can adopt 5G and reap its benefits to the fullest.

Integration with machines Increased Efficiency with 5G

MESSAGE BY

Mr. KG Chandrasekhar
Co-Chairman FICCI Industry 4.0 Committee and Head of Digital Manufacturing, SAP Labs.

History

Before we dig into 5G and the capabilities it can offer, it is perhaps best to first reflect on how the increasing wireless/mobile penetration and the speeds have transformed the way we conduct business over the past 28 years. Cellphone services were introduced in India in 1995. Whilst the price points were high and adoption levels were quite low in the beginning, a decade post the introduction started to see a heavy expansion in the number of individuals carrying mobile devices. Alongside, started an entire applications and innovation economy fueled by consistently increasing speeds that were joined with a continuously reducing price point.

Just the past decade saw a real change in the way 3G/4G technologies have transformed the economy. The share/amount of digital commerce already paints a clear picture.

It is not just the transaction volume. Ubiquitous connectivity has led to transformations in all areas right from logistics/real time tracking to personal transportation to ecommerce.

And in our personal lives, we see it much more common that we can control everything from our lights to the music that we enjoy by smart devices. My personal favorite being the ability to monitor energy consumption as well as an ability to remotely manage the appliances at home via a mobile app.

Connectivity has enabled us to manage business remotely, work and learn from home a reality and continues to drive transformation in many more ways than one.

IOT and Connectivity

Industry 4.0 offers huge transformation potential across industry verticals. The most important enablers: decreasing computing costs, connected devices, and most importantly, imaginative application of technology to drive business results. Right from closed loop processes (also referred to as data driven decision making) to generating better insights into existing operations that enable reduction of waste and enhancement of efficiency. 5G brings the perfect storm.

All of us understand that 5G is faster than 4G. 4G technology enables 5-25 MBPS while 5G is capable of 15-20 GBPS. However, the true potential is better understood by evaluating and understanding what this speed and the wireless nature of its availability enables in the industry.

Digitalizing in difficult terrain: 5G private networks can offer superfast network speeds in remote to reach spaces. There are case studies of implementation of such networks underground to

better handle mining operations. Wifi connectivity is much more expensive for a similar application. The advantages of high bandwidth and low latency in such a terrain is now possible.

Security

5G offers networking for multiple uses. Also, adds new possibilities on isolation/network management. Right from network slicing that enables tailoring each slice to a specific purpose and act as its own network and guaranteeing the performance that is required in each slice.

While 4G allowed a one-size fits all type of enablement of services, 5G supports any kind of devices by design. It is possible to support low energy consumption networks for example, for a smart watch and a fast and low latency connection for critical manufacturing equipment.

Last, but not least, better security using SIMs on both device as well as network levels apart from next gen firewalls, secure remote access solutions and secure access service edge solutions enable the right trust and operation ease.

Expanded Connectivity

More devices can be connected to the network. Upto a million devices per square KM would not be unimaginable. In comparison, 4G allowed a few thousand devices in a similar real estate space.

Edge Computing

5G makes it possible to move compute close to where the user is. Distributed data processing capabilities allow fast compute and response times for the user, thus, making lightweight applications on devices possible as they can rely on local processing instead of a public cloud infrastructure.

There are several mobile + tech operators offering the flexibility of edge deployment appliances that can take compute to where the operation happens. This will be a significant advantage for data-intensive and low latency needs for example in manufacturing or the healthcare sectors.

A couple of examples from manufacturing: from areas as simple as validating whether labels are printed in the right manner in a bottling plant (that could rely on visual inspection by machines) in real-time to whether a robotic arm is performing the right step in medicine, these areas need low latency and high performance. This really helps dissolve the space/time difference from device to edge to the cloud. More importantly, we can talk about some serious compute that can operate locally in the network.

Agreed, the machine learning may happen on the cloud. However, the application and inference can clearly move to the Edge. This means every use case from a rich point of sale at a retail

environment to sophisticated processing in a manufacturing unit are now easier possible. Especially, as greater sophisticated software lifecycle management applications are available that enable management from the cloud. Everyone desires the convenience of applying upgrades that mimic behavior of our mobile phones and watches.

Applications

As India ushers into the world of 5G and the Prime Minister made several statements about how, this can transform the industry, it is all relevant in a real-world practitioner's domain.

Everything from smart metering to signaling to manufacturing is possible.

First Movers

It is always the first movers that help fuel the innovation and imagination of an industry or a country. We clearly are at the brink of an evolution that is far larger than better curated videos on our OTT platforms. Autonomous vehicles, charging stations, factories and many more ideas, all start from the need for such a technology. Over the course of the next years, players from manufacturing to agriculture to healthcare could be the first movers while entities like insurance that are already supporting special devices in a consumer's vehicle will not be too far behind.

Call to Action

From FICCI Industry 4.0 practitioner and contributor group, I really would like to see collaboration projects that emerge between Telco providers and the consumers from industry, so we are able to establish the first lighthouse projects and programs.

Major telco providers have made formal program announcements on the commencement of their 5G services over the course the next days and weeks. The technology is here, and the promise is well understood based on successes in other parts of the world.

If we can standardize the building blocks and make entry easy, we will be able to see the next big step in Industry 4.0. Encouraging early adoption and sharing of lessons learnt as well as value harnessed would be a great way to see the real value.

#TechnologyForSustainableGrowth

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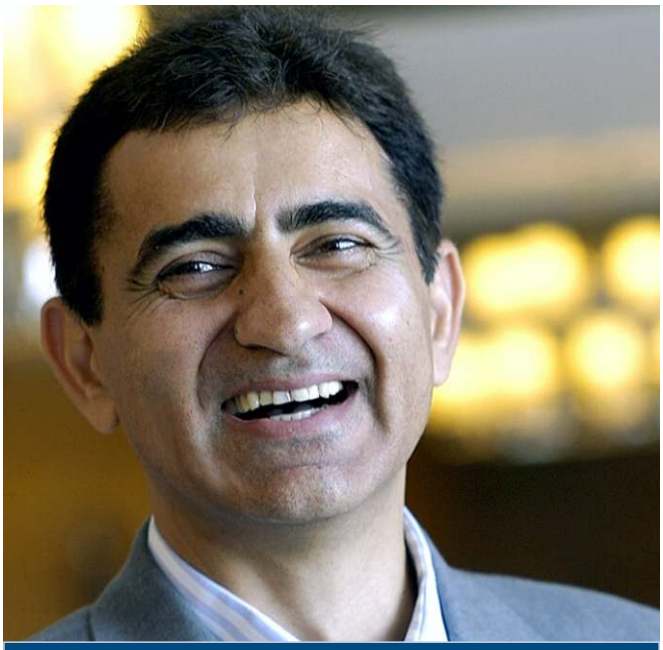
Industry 4.0: Tapping into new opportunities with 5G

ARTICLE BY



Mr. Manoj Gurnani
Chief Technology Officer, Nokia Network solutions, India Pvt. Ltd.

We are entering the age of Industry 4.0 & India is poised to play a big role in this generation.

5G+, which is 5G in combination with OT (Operation technologies like AI/ML, Robotics, sensors) will revolutionize the way factories operate. IoT, software analytics, machine learning and AI will digitally transform how we make, operate and manage our technological world.

Bell Labs Consulting, a Nokia entity, projects that ICT investment enabled by these 5G+ technologies will grow to $4.5 trillion globally in 2030, led primarily by physical industries undergoing a massive digital transformation. This huge spending infusion will mean the historical 30:70 ratio of ICT spending between physical and digital industries will invert, & will become 65:35 in favour of physical industry spend.

This investment in industries will cascade throughout the global economy - an increase in global GDP of up to $8 trillion.

We expect 5G+ to yield a 4x to 11x increase in the overall SPE metric (safety, productivity, efficiency) of a typical medium to large factory relative to current technologies

5G+ will help us to meet many of the challenges we now face in different industry verticals. It will require the digitalization of the infrastructure we use to sustainably extract resources, move them to market, manufacture, power, operate and service all aspects of our technological world, including the management of our cities and the well-being of our citizens.

Industry 4.0 enables industries to drive automation, increase business efficiency, safety, and agility, and shrink their environmental footprint by fusing physical with digital processes. To digitally transform their processes and systems, these industries need to connect all sensors, machines and workers cost-effectively, reliably and securely and in the most flexible way.

Tethering them to a wired network infrastructure is expensive and, ultimately, it will limit the possible applications of Industry 4.0 impacting the performance, mobility or security specifications.

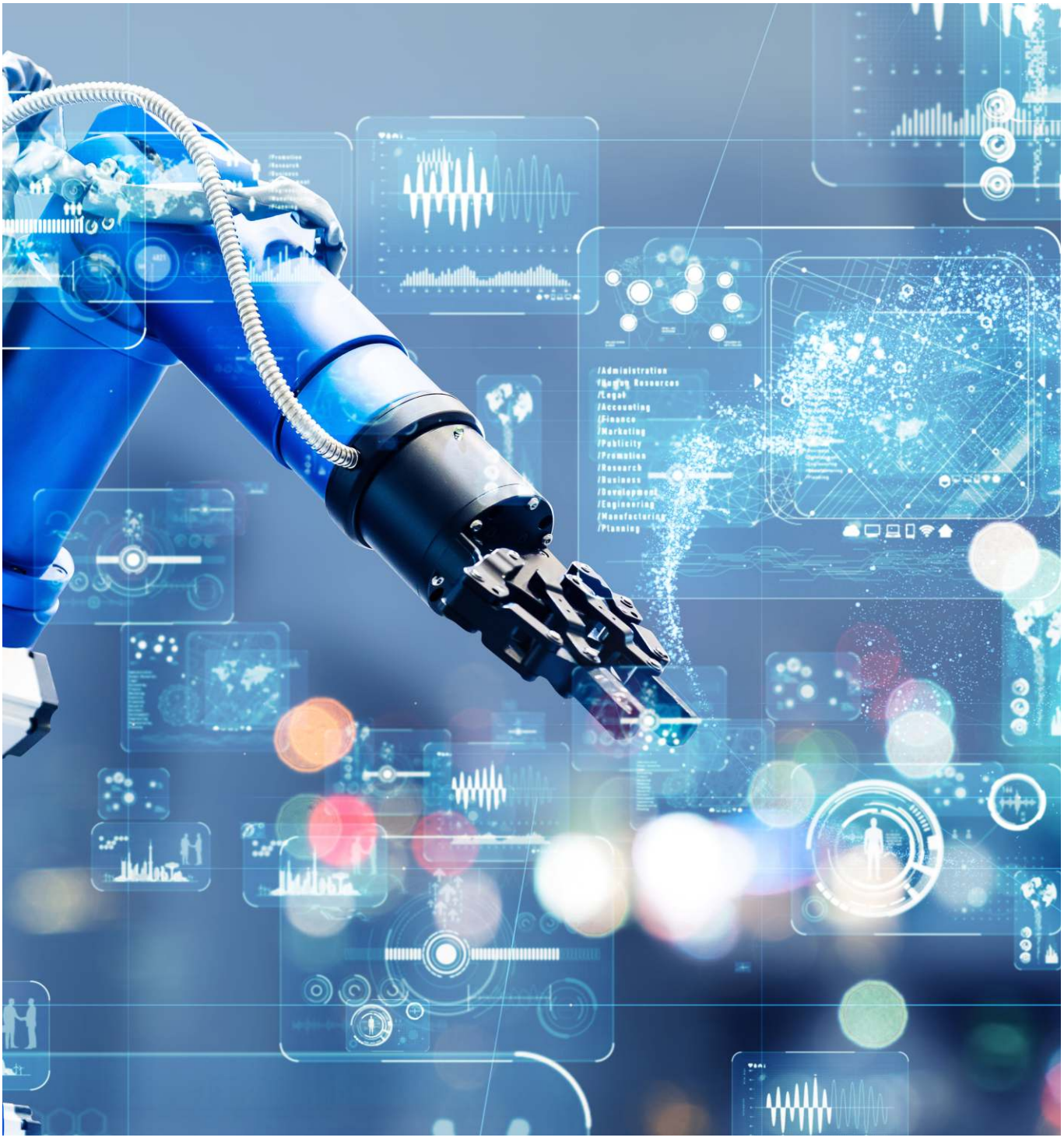
As the demand for an on-premises and customised connectivity continues to grow among the enterprises and businesses, LTE or 5G based private wireless networks has emerged as the go-to technology for providing a reliable and secure connectivity, tailored to specific needs for supporting business and mission critical applications. More so in the asset-intensive physical industries, such as manufacturing, mines, warehouses, ports, utilities etc., that are looking at Industry 4.0 to increase their business efficiency,

improve safety, become more agile and sustainable, and be better prepared for the future.

They already provide the control, security and agility that industries need to get their Industry 4.0 transformation underway, and they will continue to play a key role as 5G is introduced to handle the most demanding use cases as they develop.

Hence Industrial-grade private wireless is the best way to cost-effectively implement the widest range of Industry 4.0 applications & NOKIA is the undisputed leader in this segment

Live example : Nokia's Oulu factory has seen a 30% year-over-year improvement in productivity; efficiency gains through the reduction of robot lead time by 80%, and reduced staff floor time by 20% leading to greater worker safety.



ARTICLE BY

Mr. Harish Krishnan
Managing Director & Chief Policy Officer,
Cisco India and SAARC

In the last two years, the internet has been integrated into our daily lives. From general communication to workplace management, from healthcare to judiciary, the internet has become all-pervasive. As India is at the cusp of rolling out a high-speed 5G network, digital transformation powered by the application of internet technology will rise exponentially.

According to the GSMA, five billion people globally will have mobile internet by 2025, with about 1.5 billion in the Asia Pacific alone. However, despite the growing adoption rate and appetite for technology, India has remained a land of paradox with a glaring digital divide between urban and rural regions. According to a study by the Internet and Mobile Association of India (IAMAI), internet penetration in rural areas stood at 37% in 2021 compared to 69% in urban areas. So, 5G technology can be a great enabler of prosperity and ensure more equitable growth across the country.

Sustainability, smarter governance & better services delivery

Digitally augmenting our cities is the first step to empowering India's citizens and laying a robust knowledge economy foundation. High-speed internet services with minimal latency will open myriad opportunities across the spectrum. Leveraging JAM trinity (Jan Dhan Yojana, Aadhar, Mobile connectivity), government agencies are already delivering several services to citizens. Currently, direct benefit transfer (DBT) is enabling a host of government programmes, including PM-KISAN, the National Employment Guarantee Scheme (MGNREGS), the National Health Mission (NHM), and many more. 5G technology will make this public delivery system more efficient and seamless. It will support a wide range of use cases– from smart water meters to autonomous EMS vehicles. Moreover, by utilizing 5G connectivity, IoT and data analytics innovations can provide critical information that will further help ensure smarter governance – using technology and data purposefully to deliver a better quality of life.

Similarly, basic service delivery, including banking, education, and healthcare, can be enhanced and made accessible to all. For instance, with 5G, high-quality interactive virtual classrooms and content can be streamed all over the country from anywhere, bridging the gap between rural and urban India and opening up inclusive access to opportunities. On the other hand, 5G's low latency can improve the performance of critical care applications and will increase accessibility to quality healthcare even to the remotest of places. Telehealth, remote patient monitoring (RPM), and Smart ICU have been the outcome of rising technological interventions in recent times. This is likely to gain further momentum.

Further, with 5G, hybrid work will become a norm, and moving to the cloud is one of the easiest ways for an organization to reduce the environmental impact of its data center and IT operations. On the other hand, security will become critical. As a result, cybersecurity awareness amongst the citizens will improve, and cybersecurity policies will be strengthened.

Wealth creation at the bottom of the pyramid

Cisco estimates that by 2025, 5G will add $1.3 trillion to the global economy and create 16 million jobs in its first ten years. It can have a cumulative economic impact of $1 trillion on India by 2035, as reported Telecom Regulatory Authority of India. With the rolling out of the 5G network, hybrid working will become commonplace, and as a result, higher-paying jobs will be available to everyone regardless of geographic borders. Primarily, organisations' quest to hire the best talent from remote locations will be a game-changer for women's participation in the formal economy. According to McKinsey, India's economic output in 2025 could be 60% higher if women had equal opportunities for participation.

For small and medium businesses (SMBs), a higher digital presence will improve their market reach and make them globally competitive. Following the disruption caused by the pandemic, increased market reach through digital adoption will set the tone for a strong growth rebound.

Digitally transforming critical sectors

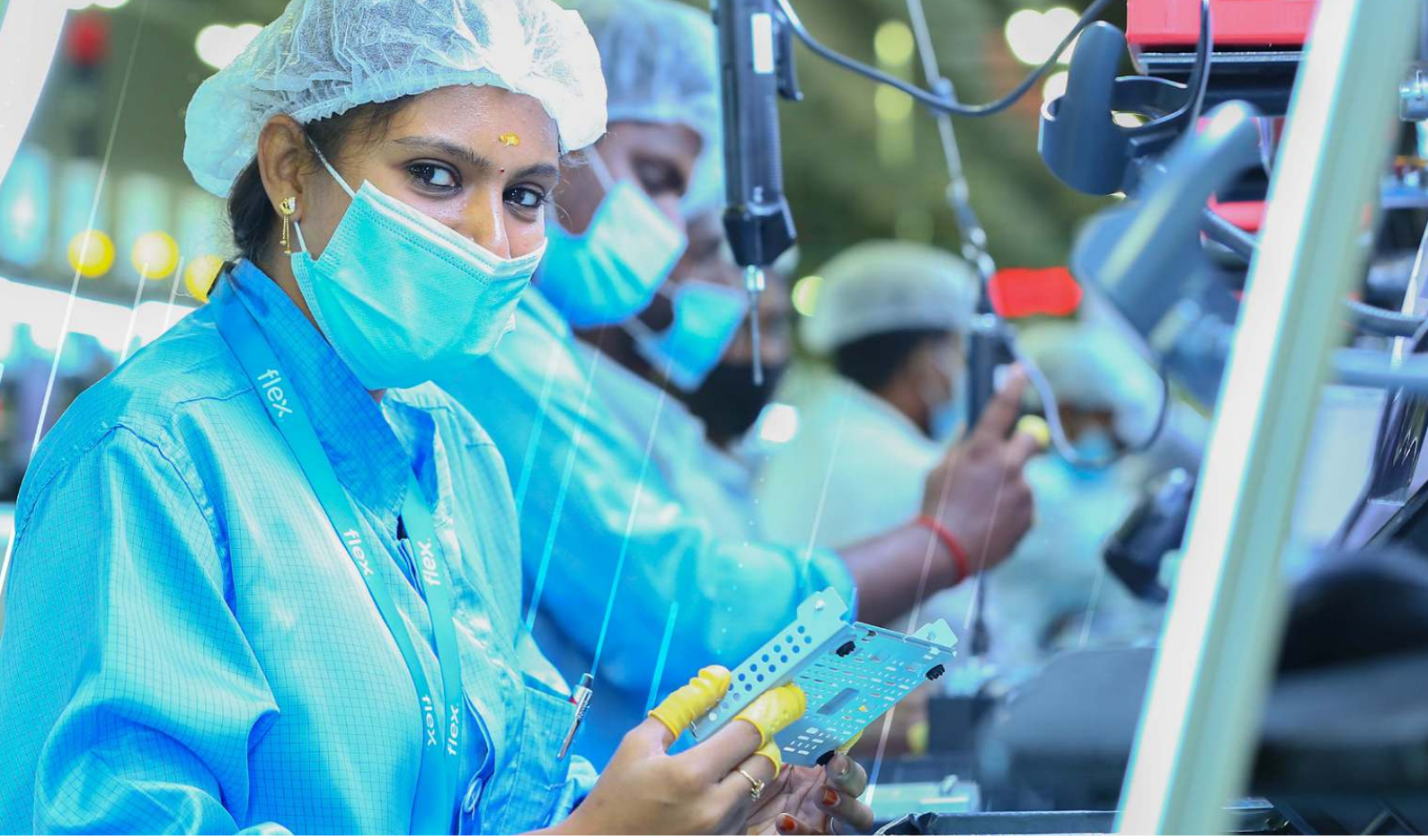
As digitization takes precedence, we know that to maximize its true potential for India, transformation must start with the primary sector. 5G will boost innovation in critical sectors, including agriculture and manufacturing. As connectivity evolves and 5G becomes a part of our lives, bringing lower latency, higher bandwidth, and faster speeds, the use cases they create, especially across sensors, IoT, analytics, etc., will revolutionize farming. It will give rise to smart farming and precision agriculture, creating new possibilities for India's farmers. According to an EY report, the addressable agritech market potential of India is expected to touch $24 billion by 2025.

5G also has a starring role in digital manufacturing. Businesses can seamlessly deploy technologies such as IoT, Artificial Intelligence (AI), and Machine Learning (ML) to improve factory safety standards. They can use predictive maintenance to cut unexpected downtime, lower maintenance costs of machinery, reduce wastage to become more sustainable, and gain more agility.

People & partnerships to power India's digital vision

To seize the opportunities of 5G, it is critical to leverage people and partnerships. According to NASSCOM, India is projected to face a shortage of 14 -19 lakh tech professionals by 2026. In this ever-changing, fast-paced environment, skills gaps can become much wider and faster. As we march steadily towards a digital economy, we need no less than a skilling revolution to bridge this considerable gap. All stakeholders – government agencies, private players, industry bodies, and educational institutions must work in sync to address the looming skill gaps and provide inclusive platforms to upskill the existing talent in emerging technologies.

5G will fire up multiple innovative technologies, solve many of India's pressing problems, and push it to become a globally tech-enabled nation. At Cisco, our purpose is to power an inclusive future for all. And as we embark on the next stage of economic growth, we truly believe 5G will be India's foundation, enabling more equitability and uplifting millions towards a better life.



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CASE STUDY

Md. Tarique Ahmad
Head of Sales & MES SME Smart Controls
India Limited

We are in an era of Digital Omnipresence.

Where every process, machine, and the domain is rapidly getting a flavor of Digitalization.

This has triggered ever increasingly data for both the providers and consumers seamlessly integrated to facilitate an enhanced level of user experience.

The data providers namely mechanical data entry and automatic data acquisition are generating an exponential amount of data in real-time; leading to a copious amount of information in real-time and being consumed universally across all digital devices.

The soul of all digitization is data, and 5G technology will revolutionize the handling of data. The 5G technology enables higher data capacity and a faster speed of more than 10 GB per second. It possesses the capacity to connect billions of devices. Another markable feature is a huge reduction in latency to less than 1 millisecond from the present 50ms.

This will enable solutions and applications that could not have been possible with longer response times and huge data exchanges.

IoT / IIoT has already provided a path to connect everything and make machines talk to each other. We are witnessing Smart Manufacturing with Industry 4.0, where the machines are not only connected to plant networks but also tightly coupled with enterprise-wide functions.

Adoption of 5G technology can bring multiple benefits including increased throughput and efficiency. 5G is set to transform existing applications and provide a platform for innovation.

Warehouse Execution

In manufacturing industries, it needs warehousing at every step at different scales for Raw Materials, Work in Progress materials, and Finished Goods.

Adopting the industry 4.0 paradigm, the industry is able to control the movement with multiple checks. There are many technologies that can impact the movement and storage of materials in the plant.

Autonomous vehicles/ Automatic Guided Vehicles/ Automated Storage and Retrieval Systems are innovations that are changing logistics dynamics. These systems are making high-speed decisions that are not possible for humans.

To decide in real-time at split seconds, the combination of faster data computation by the servers and the faster transfer of data with multiple connections is needed. There are times when the fast-moving conveyer needs immediately processed input in fractions of seconds. This is where 5G technology can play a crucial role and help the industry to identify the best use cases and improve efficiency.

Machine Maintenance

The persistent efforts to increase and maintain Overall Equipment Effectiveness (OEE = Availability * Production * Quality) has always been the driving factor in the industry. A small

improvement in any of the OEE contributors brings a big change.

The recent times of the COVID pandemic have marked a new bottleneck, that in-person availability across the globe cannot always be as easy as it used to be.

To attain machines' higher availability, many industries are using augmented reality for equipment maintenance and repair. The AR system can tell the user what replacement parts are needed and even whether they are in the warehouse. Utilizing AR for the unknown or new problem element in breakdown scenarios, where an engineer must visit and visually check the machines remains a challenge.

if the backbone is not 5G and is not fast enough, the AR data transmission is limited. By adopting 5G technology, the huge data from High-Definition video and AR can be transmitted at a faster speed to remote experts. Making it easier to analyze and identify the possible root cause and take the action faster.

Even in no breakdown scenarios to make it better at predictive and preventive maintenance. IoT sensors are regularly installed on machines to monitor the health, critical parameters, and equipment status. 5G technology can provide real-time information about their condition. Which will result in taking informed decisions at right time and cost savings on repairs.

Quality Control

The nightmare for any manufacturing plant is the manufacturing errors, it is expensive and time-consuming, reducing overall plant effectiveness, generating scraps and machine downtime.

A manufacturer can take a better decision and fix the area which is causing the bad quality before it starts rolling out of the production line. The system needs to capture the data at real-time speed and collect the required quality parameters from multiple devices.

5G enables the connection of many devices. This helps in improving the quality by runtime vital property analysis. Inline quality control tracks the process every second to complement lab testing and facilitate continuous quality improvements which result in

1. Product quality assurance
2. Reduce product scrap
3. Increase plant availability
4. Reduce raw material

Enhanced Digital Twins

A Digital Twin is a digital replica of any process, system, equipment, tool, or physical asset. The process or asset which impacts the business is replicated to analyze scenarios. Which will enhance and help in increasing overall efficiency. In manufacturing, Digital Twins are being built for assets, specific production lines, or any other "real world" scenario within a production process.

The digital twin relies on the data center, data transfer speed, and latency.

The advantages of 5G Technology,

a. 10-20 times faster speed than with 4G.
b. Highest Reliability with lowest latencies below 10 ms.
c. Up to 1 million devices can be connected per square kilometer.

All the above advantages of 5G will make digital twins more capable, providing faster data capture from IoT sensors and data analytics. Digital twins offer end users virtual tools for managing assets and resources while improving performance. 5G shall enhance the effectiveness of digital twins in real time and bring out the hidden performances of the plant.

Hybrid Cloud

The centralized MES/MOM solutions are the need of the hour for organizations having manufacturing plants in more than one geographic location. Most of the time onsite the IT Datacenter works as an edge layer with plant-level data storage and computing power and offsite the cloud servers are being used for enterprise-level complex business applications and big data storage.

Each digital transaction is first processed at the edge layer and integrated computing, validations are taken place offsite. Benefiting from 5G speed and latency, A hybrid cloud environment can be set up and reduce the multi-level processing at the edge and cloud layer and provide near real-time response from cloud servers.

A hybrid cloud environment encompasses the offsite infrastructure of cloud servers, storage, and big data analytics with the onsite infrastructure of computers, sensors, peripherals, and edge devices. It shall reduce the complex IT layer at each plant location and enable to have a true centralized solution.

Global News Industry 4.0

Standard 5G NB-IoT Connectivity Provider Joins IoT M2M Council

The IoT M2M Council, with more than 25,000 members, continues to support the deployment of IoT/M2M solutions by promoting use cases in industries like automotive, manufacturing, healthcare, public infrastructure and retail. The council that averages 300 adopters a week makes the benefits of connectivity visible to adopters.

Satellite connectivity provider Sateliot joined the IMC to raise awareness of its novel technology that seamlessly combines low earth orbit (LEO) satellite connectivity with more traditional cellular networks and under standard 5G protocols. The combined connectivity service allows for ubiquitous global coverage at a fraction of the cost of traditional satellite connectivity – which is also typically offered based on proprietary solutions.

Link – https://www.iotevolutionworld.com/iot/ar ticles/453435-standard-5g-nb-iot-connectivity-provider-joins-iot.htm

New IIC test drive bundles IoT, digital twin, blockchain for marine rentals, tracking

The Industry IoT Consortium (IIC) is running a "short-term, rapid-engagement" pilot to develop a blockchain-based peer-to-peer IoT network for the marine industry. The work will engage various IoT, digital twin, and blockchain elements, to deliver fleet management, tracking, and security, including boat-to-dock payments, maintenance scheduling, and general asset management.

The new Marine Management Test Drive, scheduled to run for three-to-six months, is spearheaded by a US-based firm called Ahoy (stylised AHOY), billed as a "global infrastructure company"

Link – https://enterpriseiotinsights.com/20220909/internet-of-things-4/new-iic-test-drive-bundles-iot-digital-twin-blockchain-for-marine-rentals-tracking

The global satellite IoT subscriber base to reach 21.2mn by 2026

According to a new research report from specialist IoT analyst firm Berg Insight, the global satellite IoT communications market is growing at a good steady pace. Despite the impact of the COVID-19 pandemic, the global satellite IoT subscriber base grew to surpass 3.9 million in 2021. The number of satellite IoT subscribers will increase at a compound annual growth rate (CAGR) of 40.3% to reach 21.2 million units in 2026.

Link – https://www.iot-now.com/2022/09/07/123558-the-global-satellite-iot-subscriber-base-to-reach-21-2-million-by-2026/

IoT Gateways forecasted to grow to nearly $48bn in revenues by 2026

Gateway devices are used in nearly every IoT market. Factors driving the growth of gateways over the next five years include the transition to cellular from fixed line, replacement of 2G/3G gateways, as well as rapid growth in the industrial and infrastructure markets. This latest iteration reflects a post-COVID view of the gateway market. Global technology intelligence firm ABI Research forecasts that the IoT gateway market will grow to nearly [$48 billion (€48.58 billion)] in annual revenues by 2026.

Link – https://www.iot-now.com/2022/09/07/123542-iot-gateways-forecasted-to-grow-to-nearly-48bn-in-revenues-by-2026/

Actelis claims big ramp-up for airport IoT networks in seven countries

California-based wide-area IoT network provider Actelis Networks has claimed it has received $312,000 in orders since reporting a major multi-year deal with an unnamed provider of airport operations management systems to "modernise and digitise networks". Actelis Networks said the contract, announced on a recent earnings update, will upgrade wide-area IoT networks in "hundreds of airports across 39 countries

Link – https://enterpriseiotinsights.com/20220906/internet-of-things/actelis-deploy-iot-networks-key-airports-seven-countries

"Start small, start smart" – the Industry 4.0 road to scalability, sustainability with Bosch

The timing of the US edition of Germany's big Industry 4.0 trade show, Hannover Messe USA, scheduled for next week, makes for a useful, albeit coincidental and unconnected, prompt to run the interview, finally (and with apologies). So here it is: a high-level view of the state of the Industry 4.0 market, from Bosch, an elite-level, Industry 4.0 user-seller, in the home of Industrie 4.0

Link – https://enterpriseiotinsights.com/20220905/industry-4-0/start-small-start-smart-the-road-to-industry-4-0-scalability-and-sustainability-with-bosch

5 things you need from an IoT connectivity management system

IoT solutions are truly revolutionising our world and the way we operate on a daily basis. With every new development, improvement, or function, IoT solutions have more opportunities to make an impact for end-users. And for every IoT solution – from personal healthcare devices to sustainable, smart living plant walls – you need a reliable, agile system to easily manage your connected devices.

Link – https://www.iot-now.com/2022/08/28/123328-the-top-five-things-you-need-from-an-iot-connectivity-management-system/

L-com expands line of sensors to address IoT applications

L-com, an Infinite Electronics brand and a supplier of wired and wireless connectivity products, recently announced it has expanded its line of sensors that address IoT applications. The new IoT sensors offer pinpoint accuracy in measuring pressure, temperature, humidity, dissolved oxygen, electrical conductivity, pH, chlorine and turbidity.

L-com's new pressure and temperature sensors feature a micro-fused silicon strain gauge, a leak-free elastomer structure, integrated temperature compensation, independent pressure and temperature outputs, and robust resistance to shock, overload and vibration. Their applications include industrial process and control, automated detection, hydraulic and full-motion control, pumping stations and water treatment systems.

Link – https://www.iot-now.com/2022/08/26/123318-l-com-expands-line-of-sensors-to-address-iot-applications/

Tuya Takes IoT Initiative Against Climate Change

One big challenge for sustainable development is climate change. Countries are striving to achieve carbon neutrality to minimize the impact of greenhouse gases. The U.N. presented the goal to peak carbon emissions before 2030 and achieve carbon neutrality before 2060, entering a new stage of climate governance.

As a result, environment, climate risk, low-carbon, energy conservation and carbon reduction are becoming the new global consensus and the universal ESG standards. Tuya, an IoT development platform service provider, is taking on its own approach in the sustainability initiative. Tuya released a mini program that is suitable for all households to help everyone save energy in even smarter and easier ways.

Link – https://www.iotevolutionworld.com/viewette.aspx?u=https%3a%2f%2fwww.iotevolutionworld.com%2fiot%2farticles%2f453303-tuya-takes-iot-initiative-against-climate-change.htm

Aeris launches IoT readiness calculator to instantly determine enterprises' level of preparedness when launching IoT projects

Aeris, a global Internet of Things (IoT) solutions provider has announced the launch of the IoT Readiness Calculator, a free online tool to help determine enterprises' level of preparedness for deploying IoT solutions.

The IoT Readiness Calculator provides organisations planning IoT projects with a scorecard that details the readiness of your IoT project from a business and technical perspective and how it compares to others in the same vertical market or geography. It will also help you identify potential issues in your IoT launch plan, so you can remediate them before they become costly.

Link – https://www.iot-now.com/2022/08/22/123167-aeris-launches-iot-readiness-calculator-to-instantly-determine-enterprises-level-of-preparedness-when-launching-iot-projects/

More isn't always better: Three dangers of cheap IoT devices

More isn't always better. Despite the Internet of Things (IoT) growing to 15 billion worldwide devices next year, many are cheap in price and quality. The result is lowering cybersecurity and overloading networks at a time when devices are increasingly entering the home and workplace.

This rapid increase in device quantity - with little regard for elements like usability and cybersecurity - is what some refer to as the "Internet of Crap". A funny name, sure, but one with serious potential for damage. Let's look at three real dangers created by these devices and what consumers can do to protect themselves.

Link – https://enterpriseiotinsights.com/20220818/internet-of-things-4/more-isnt-always-better-three-dangers-of-cheap-iot-devices

India News Industry 4.0

Leveraging Emerging Technologies For Efficient Smart Cities

While many cities are still working on improving their infrastructure, the more advanced smart cities are using technologies such as AI, ML, IoT, and big data to support sustainable development, meet residents' rising expectations and improve resilience

Link – https://www.businessworld.in/article/Leveraging-Emerging-Technologies-For-Efficient-Smart-Cities/30-08-2022-444428/

Reliance announces Giga Factory for power electronics

Mukesh Ambani, chairman of Reliance Industries, on Monday said the company will be setting up a Giga Factory for photovoltaic panels, energy storage, green hydrogen and for fuel cell systems.

Link – https://www.fortuneindia.com/enterprise/reliance-announces-giga-factory-for-power-electronics/109458

Vodafone Idea seeks partners to boost enterprise segment: Report

Indian telecom operator Vodafone Idea is focusing on potential partnerships with the aim of expanding its enterprise solutions following the acquisition of 5G frequencies, local newspaper The Economic Times reported.

"The 5G ecosystem is still evolving. Our intent is to work across industry, work across different use cases to try to see if we can stimulate and work with users to find ways to accelerate the adoption of use cases," Arvind Nevatia, chief enterprise business officer at Vodafone Idea, was quoted as saying.

Link – https://enterpriseiotinsights.com/20220824/5g/vodafone-idea-seeks-partners-boost-enterprise-segment-report

IIT Jodhpur Develops Framework To Enhance Performance Of IoT Systems

Researchers from the Indian Institute of Technology Jodhpur, Indian Institute of Information Technology Guwahati and Indian Institute of Technology Kharagpur have performed cutting-edge research in the area of Internet of Things (IoT). The team has developed architectures and algorithms to enhance the efficiencies of data collection and transmission associated with IoT devices and applications.

The research paper has been published in the journal, Future Generation Computer Systems, Elsevier, and is co-authored by Dr Suchetana Chakraborty, Assistant Professor, Department of Computer Science and Engineering, IIT Jodhpur, Dr Sandip Chakraborty, Associate Professor, Department of Computer Science and Engineering, IIT Kharagpur and Anirban Das, Research Scholar, Department of Computer Science and Engineering, IIIT Guwahati.

Link – https://www.businessworld.in/article/IIT-Jodhpur-Develops-Framework-To-Enhance-Performance-Of-IoT-Systems/16-08-2022-442349/

Seven challenges against securing the systemic cyberspace in the industrial IoT age.

As organisations in the growing industrial IoT space become increasingly mutually dependent on one another and contribute to growing systemic cyber-risk, here are the seven most important emerging anti-forces they face.

Link – https://www.forbesindia.com/article/iim-calcutta/seven-challenges-against-securing-the-systemic-cyberspace-in-the-industrial-iot-age/78113/1

L'Oréal R&I Announces Collaboration With NASSCOM CoE For Tech

Innovations From India This joint initiative will help address the potential application of emerging technologies like AI, ML, IoT, AR / VR / MR etc in cosmetic/dermatological product development, consumer evaluations, personalisation and process optimization for accelerating/augmenting the L'Oreal R&I teams

Link – https://www.businessworld.in/article/L-Or-al-R-I-Announces-Collaboration-With-NASSCOM-CoE-For-Tech-Innovations-From-India/12-07-2022-436745/

IoT sensors: A way of smart automating agriculture

India ranks in second place for farm outputs worldwide, and 42% of Indians are engaged in the agriculture sector. It's pretty clear that India is a country that is highly dependent on this sector. This, says Ritesh Sutaria, director at Prompt Equipments Pvt Ltd., is a sector that has a big impact on the country's need to grow by shifting from outdated methods.

With the growing need and population, it has become mandatory to change the system. According to the UN, the world's population will be around 9.7 billion by the end of 2050, which will drive global agriculture production to increase by 69% from 2010 to 2050.

The only possible way to transform agriculture is by adopting the latest technologies. Sensor systems in agriculture are the one way to introduce smart agriculture.

Link – https://www.iot-now.com/2022/06/29/122060-iot-sensors-a-way-of-smart-automating-agriculture/

Google Cloud to Shut Down IoT Core Service

Google Cloud will be retiring its IoT Core service in August next year, citing an inability to properly serve customers with specific IoT needs.

The announcement was made via email to customers, as well as with a banner at the top of the IoT Core webpage.

Link – https://www.iotworldtoday.com/2022/08/23/google-cloud-to-shut-down-iot-coreservice/#:~:text=Google%20Cloud%20will%20be%20retiring,of%20the%20IoT%20Core%20webpage.

IIT-Madras sets up centre for smart manufacturing

The centre will create platforms for MSMEs. The Indian Institute of Technology, Madras, has launched a smart manufacturing and digital transformation centre (SMDTC) to focus on collaborative research and innovation in smart process intelligence, 5G enablement and smart manufacturing supply chain collaboration.

The centre will create foundation elements of manufacturing execution system, internet of things (IoT) database and manufacturing intelligence software platforms for Indian MSMEs that adopt industry 4.0 practices.

Link – https://www.thehindu.com/news/national/tamil-nadu/iit-madras-sets-up-centreforsmartmanufacturing/article65661955.ece#:~:text=The%20Indian%20Institute%20of%20Madras,smart%20manufacturing%20supply%20chain%20collaboration.

Over 4,500 DPIIT-Recognised Startups Working In Emerging Tech Sectors Like AI, IoT: Govt

Minister of State for Commerce and Industries Som Parkash on Friday (July 22) informed the Parliament that more than 4,500 startups working in the domain of emerging technologies have so far been recognised by the Department for Promotion of Industry and Internal Trade (DPIIT).

Link – https://inc42.com/buzz/over-4500-dpiit-recognised-startups-working-in-emerging-tech-sectors-like-ai-iot-govt/

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