

A Holistic Approach to Scalability and Business Outcomes in the IoT

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Introduction

Enterprises in many industries are undertaking digital transformation initiatives to enhance services, control costs and improve business outcomes. The Internet of Things (IoT) provides the digital linkages to physical objects needed to drive towards the desired ubiquitous connectivity. But the IoT involves a complex and diverse ecosystem of technologies and services, making it difficult for enterprises to justify and plan.

IoT, a crucial digital transformation technology, allows companies to improve their operational

efficiency. Big data analytics, cloud computing and edge computing are just some of the technologies that drive demand for enterprise digital transformation. Along with the proper assessments and planning, a common IoT platform enables faster development and deployment. This paper discusses the market changes, challenges and responses driving the enterprise business case for a holistic approach to the IoT.

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Trends

Business disruptions from technology advancement, the pandemic and other societal changes create opportunities. Across industries, the IoT is growing in importance to support digital transformation. Several specific trends are driving changes and affecting the IoT.

Less growth/scalability from pilots and PoCs than anticipated

When the IoT emerged, the mantra was to start small, show the benefits and then scale to deploy fully. One advantage of the approach was the ability for businesses to start with little technical know-how or connection to corporate systems. So, IT disruption using the IoT often comes from business-led initiatives that start with small collaborative pilot projects, sometimes without IT involvement. But many IoT pilots launched amidst excessive hype, and many didn't scale because they didn't involve the IT organization and couldn't show adequate ROI.

Successful pilots show the ROI for full deployments, get executive buy-in, involve IT and then go. Those that have been most successful quickly are the closed systems – factories, airports and campuses for example. In these environments, even small productivity improvements are important and can be more easily measured. Such environments are

also more conducive to private 5G deployments, removing or reducing the need to rely on emerging and scattered public 5G networks.

Pandemic drives business changes that favor digital

While the pandemic slowed IoT development in industries reliant on travel, use cases are visible across sectors from cold chain supply chain improvement in pharmaceuticals to shop floor equipment effectiveness in food manufacturing. The Internet of Medical Things (IoMT) has emerged to help enable virtual patient care. While supply chains have been stressed, manufacturers need smart connected factories to rapidly adjust production while keeping up with the competition and fluctuating demand.

With the growing trend of the remote work model following the COVID-19 outbreak, organizations are increasingly adopting the bring-your-own-device (BYOD) approach. As workplace devices are potentially vulnerable due to the lack of efficient, comprehensive security solutions, the demand for endpoint security has increased following the nationwide lockdowns. Furthermore, the pandemic has pushed the demand for managed IoT security services to safeguard organizational and employee data.



Positive customer experiences and consumer-grade interfaces expected

Customer experience is a critical differentiator for most enterprises today. When the pandemic struck, many customers turned to digital channels with high expectations for easy access and personalization. But unprepared enterprises were challenged with providing a superior digital customer experience. Organizations that offer digital experiences with instant information and on-demand capabilities raise the bar for all businesses. Highly visible incidents can shine a spotlight on poor customer experience in business processes, while the ability to record and report incidents becomes ubiquitous.

Technology has an important and growing role in capturing and measuring those experiences, however, it can only supplement an underlying






culture of service. And only through proper integration and coordination via a platform can the disparate technologies and systems deliver positive customer experiences.

Enterprises that innovate and deliver better experiences can sustain and thrive in a competitive environment. Undoubtedly, the ones that deliver superior experiences have been able to retain existing customers and attract new ones, especially in an era when it takes only one bad incident for a customer to switch brands.

Proliferation, more capabilities and price reduction of sensors

The ubiquity of devices and sensors, via the IoT, combines with the global expansion of mobility via smartphones and other portable devices to provide a steady ongoing stream of data. Sensors are everywhere!

Figure 1: Ubiquitous Connectivity

 On a Person	 In Buildings	 In Vehicles	 In Public Spaces	 In the Sky
Smartphones Positioning, Sound, Movement	Cameras and Motion Safety, Security	Cameras and Motion Object Detection, Visibility	Cameras Crime Prevention, Traffic Monitoring	Satellites Change Detection, Measurement, Mapping
Smart Watches Positioning, Sound, Movement	Chemicals, Liquid Environmental	Positioning Navigation, Tracking	Chemical Environmental	Airplanes, Helicopters Surveillance, Mapping
Headgear (VR/AR) Training, Service, Attention Tracking, Gaze Detection	Temperature and Light sensors Comfort, Energy Efficiency	Vehicle Systems Maintenance, Performance	Motion Disaster Management	Drones Change Detection, Measurement, Surveillance, Mapping
Apparel Temperature, Moisture	Biometric Security, Safety	Biometric Security	Face Recognition Security, Crime	Balloons Weather, Air Quality
Worn on body	Embedded in assets	Embedded in parts	Embedded in assets	Embedded in micro-satellites

Source: ISG Research



IoT is gaining significant traction, further driven by the integration of new technologies. These newer technology advances include some innovations that can scale and integrate with existing systems, for example cognitive computing, video, virtual reality and augmented reality, and wearables. The future holds more advancements:

- Smaller: Micro and microscopic sensors
- Faster: 5G, broadband wireless
- Easier to Make: 3D Printed
- Easier to Find: Location tagged
- Easier to Interact With: Voice, gesture, brain interfaces
- Not Permanent: Biodegradable sensors
- Less Energy: Low power, solar powered, self-powered
- Less Maintenance: Self-healing
- Ever-present: Cell-based
- Collaborative: Swarms
- More Secure: Secure channels, digital certificates, blockchain

IoT devices will account for most of all global networked devices soon, according to various reports,. Across industries and geographies, sensors are collecting data to feed applications that help businesses make decisions, optimize processes, reduce downtime and improve customer service.

IoT applications are extending from small, tempered pilot projects to concrete, scalable industry-specific scenarios.

Network Infrastructure Improvements

Meanwhile, vehicles from scooters to mass transit assets are becoming powerful mobile computers that are connected to improve safety and customer experience. Wearables enable virtual patient care and personal convenience. Sensors monitor for security, efficiency and problem avoidance. The so-called edge of the network is hosting more capabilities than ever. All rely on the vast web of not only the cellular networks but also Wi-Fi, Bluetooth, RFID and other technologies.

For cellular networks, 5G excites businesses looking to benefit from lower latency for the IoT and IIoT. Yet according to a recent ISG Mobile Map research analysis, not all spectrum types are available in every region or with every mobile network operator, and 5G implementation is uneven around the world. Operators will frequently choose to shut down older mobile networks and re-farm the spectrum for 5G to retain the quality of wireless networks while controlling expenses. Overall, however, network infrastructures are extending and expanding to support the growing multitude of connected devices and systems.

Challenges for Enterprise

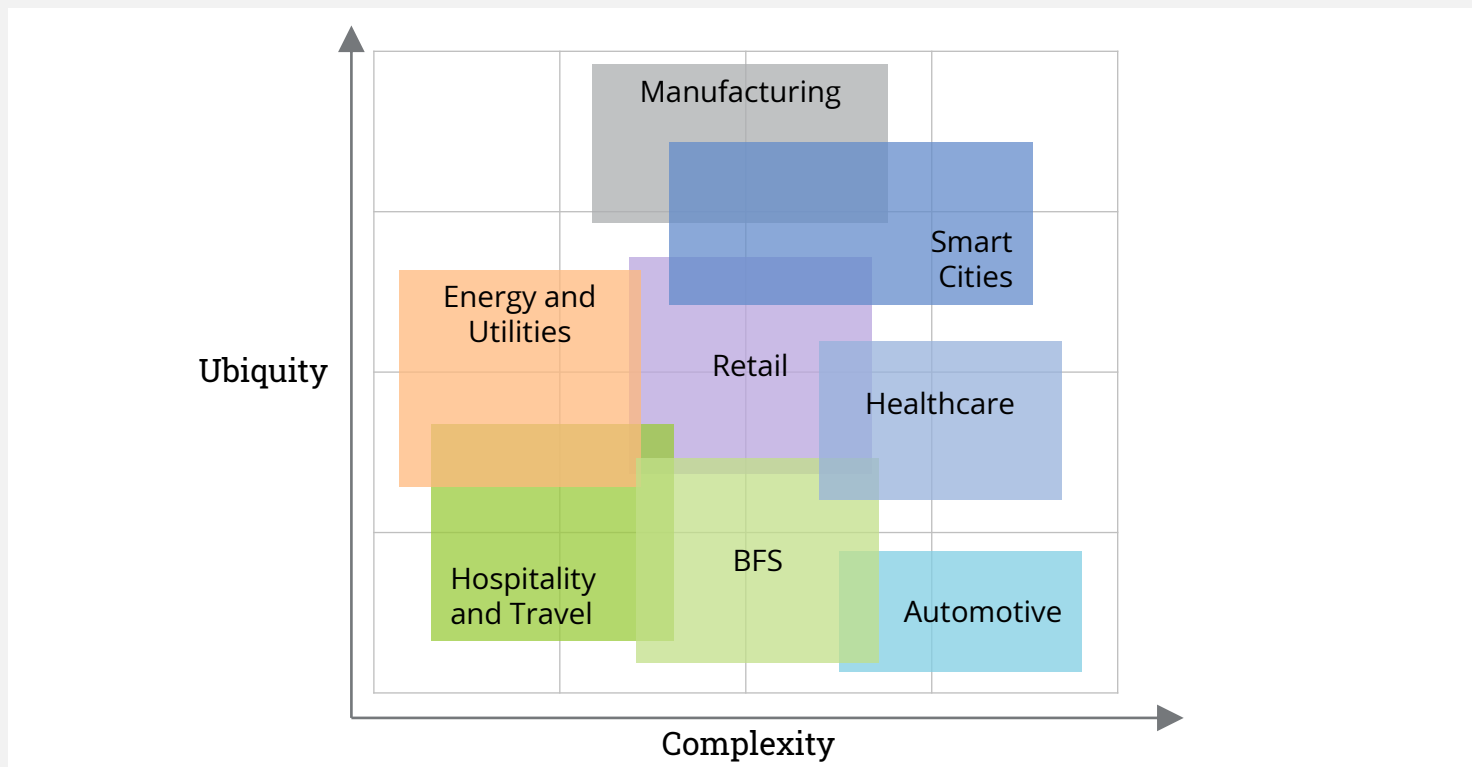
Despite the maturity of the technology infrastructure, enterprises face challenges when implementing IoT systems. The challenges start before any money is spent, as they seek to rationalize and plan deployments. In deployment, several elements are tricky as enterprises juggle the sometimes competing objectives of improving customer service, security and cost. Several categories of challenges emerged from our recent discussions with enterprises for this paper and

with service providers for the 2021 ISG Provider Lens™ study, [Internet of Things - Services and Solutions](#).

Ubiquitous connectivity affects some industries more than others, at different paces, in different ways. Enterprises will need to sort through the many options for going digital, focusing on their industry's best practices and successes.



Figure 2: Industry Variance of Ubiquitous Connectivity



Source: ISG Research

Justify and support scaling from initial IoT deployments

While the IoT is past the brand-new stages of its early years, much remains unproven. At the same time, pilot deployments need to either expand or shut down. Therefore, enterprises face the need to regularly evaluate, justify and communicate the costs and benefits of IoT deployments. Scaling from initial deployments requires not just more of the same, but standards, additional tools and platforms, and oftentimes, service partnerships.

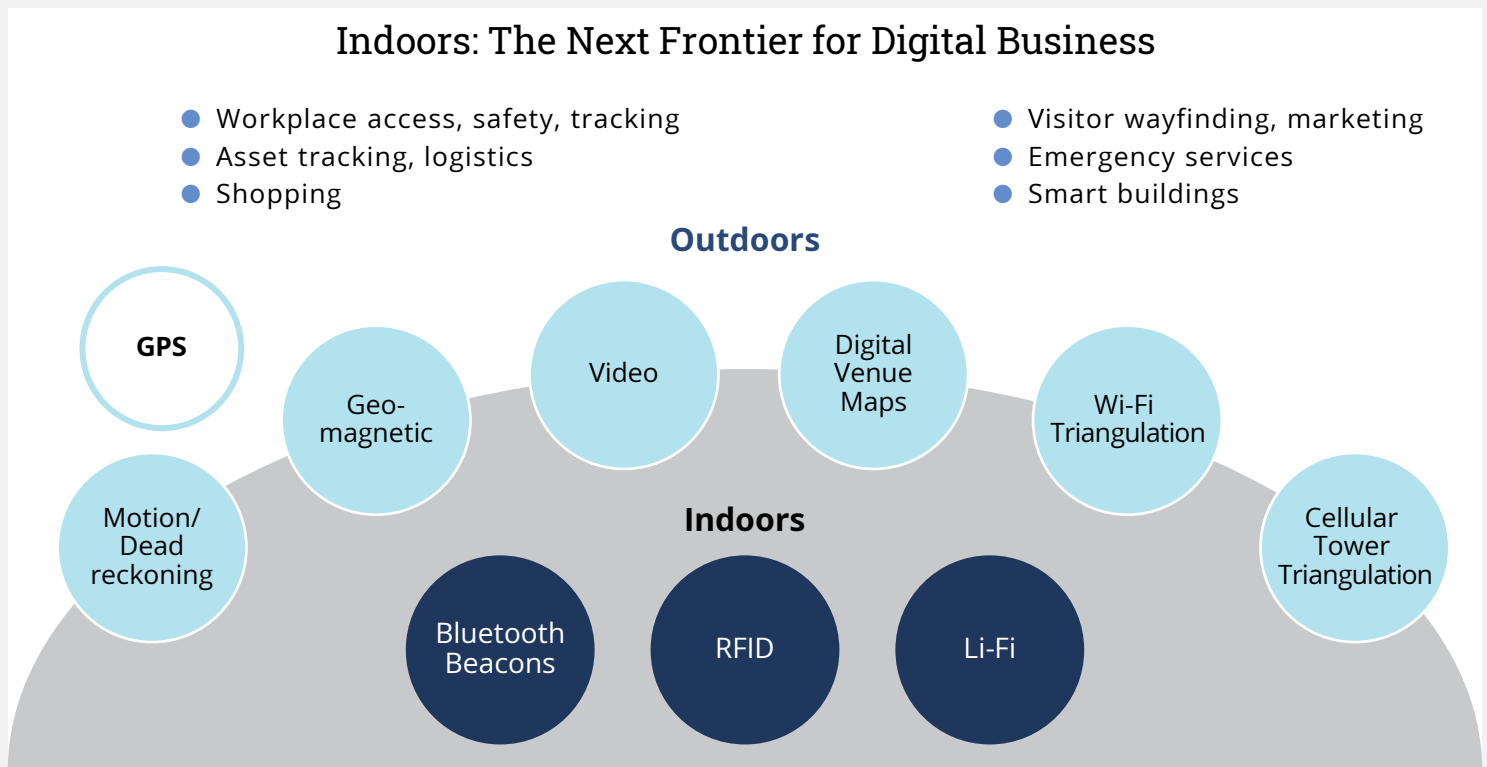
The IoT ecosystem has unprecedented geographic distribution, a very large number of nodes and connected applications. The IoT is creating a Big Data challenge of enormous magnitude, challenging enterprises on how to best manage and leverage the capabilities.

Improve customer, partner and employee experiences

Businesses seeking to improve the customer experience need to know where customers live, work and travel. While it's straightforward to obtain the position of people with their mobile devices outside, most people spend much of their time indoors – where position determination is difficult. The business opportunity is to improve services and grow revenue by providing a customer experience appropriate for and unique to each person according to where they are – outdoors or indoors. Indoor location technologies cannot rely on the Global Positioning System (GPS) available in many mobile devices because the signals do not reliably travel through buildings. So, to capture location, indoor solutions incorporate many different technologies and approaches.



Figure 3: Connected People and Devices are Everywhere



Source: ISG Research

Provide security for data protection, reputation management and regulatory compliance

Connected systems are vulnerable, and IoT endpoints are natural targets. Service providers are tackling the challenge by bundling security services into their consulting and managed services engagements, especially those that are focused on IT/OT convergence. Security services run the gamut from strategy, assessment, detection, threat intelligence monitoring to remediation. They cover the entire IoT ecosystem from the edge to the cloud to on-premises systems.

The COVID-19 outbreak has led most organizations to adopt a remote working model for their employees. This means employees might use their

own devices, increasing risk for enterprises. The pandemic has also triggered a high demand for managed IoT security services to safeguard the data of organizations and their employees.

Enterprises across the globe are seeking integrated IoT security solutions to reduce costs and improve safety in their facilities. The cost of implementation and monitoring of individual solutions is high. Therefore, the need for integrated IoT endpoint security solutions is expected to increase. This will eventually lead to higher market demand for all the individual security components, necessitating services to manage the growing complexities.

Furthermore, there are significant obstacles to wider IoT deployment and general societal acceptance. To succeed in their digital initiatives, enterprises will need to navigate local, national and global regulations, laws and social norms, and tackle security, privacy plus other data and network management challenges.



Addressing the Challenges with Holistic Approaches to the IoT

The IoT management platform concept

An IoT platform is the software layer of a technology architecture that connects all the other layers in an IoT technology stack that encompasses hardware, network, data and cloud, application platform and software applications. It enables applications to be deployed that can monitor, manage and control connected devices. Its key capabilities include remote data collection from connected devices, secure connectivity between devices, sensor management and integration with third-party systems. IoT platforms are the key interface for:

- Device communications – to measure, control and regulate
- Data management – to handle tasks such as save, integrate, analyze and visualize device data
- Device management – provide security and functional software updates on devices
- Process management – route requests according to required workflow

Platforms can also help provide capabilities across a supply chain, increasing its visibility to adjust to demand and improving worker safety. Platform success lies in its features for scalability, interoperability, and security, in how well it is funded, promoted, implemented, serviced and its results measured. It is critical to have a scalable architecture with a foundation to develop custom solutions to meet an enterprise's digital transformation requirements.

Major capabilities to expect

Modular platforms typically include IoT-focused analytics to enhance operational efficiency and to enable scale in big data environments. IoT platforms also have reference architecture frameworks that model the integration of IoT and non-IoT data and various third-party software.

IoT edge systems produce large volumes of data that often can't be transferred to central storage rapidly, securely and without interruption. This latency significantly limits the analytical capabilities of certain applications within the IoT solution. To address these shortcomings, innovative edge systems integrate AI applications to undertake certain complex analytics on the edge. This edge capability allows the system to make immediate decisions and take quick action locally without relying on the analytics capabilities of centralized systems.

Main benefits of the approach

IoT platforms facilitate the critical tasks of integration of the existing core applications and systems with new services and platforms. The aim is a substantial capability for managing the connected ecosystem for digital business. Platforms enable always-on command and control of the IoT ecosystem to quickly identify trouble and reduce downtime. Scalability is another benefit derived from the right IoT platform, as they offer not only robust tools and services to handle large deployments, but also provide flexibility and modularity.



Recommended Actions

As with other projects, after planning for digital, it is critical to deploy integrated solutions, measure the results regularly and then fine-tune for optimal outcomes.

The goal of digital business transformation is to grow the enterprise by providing the right products and services to customers, employees and partners and remaining competitive. To foster innovation, enterprises must be willing to behave differently. IT organizations within the enterprise need to overcome the considerable inertia of built-in processes and technology challenges. Planning and execution are critical. IT must support continuous delivery, so change does not disrupt the business.

For the IoT and digital business, how will enterprises:

- Make a business case?
- Ingest best practices for needs evaluation, selection and implementation?
- Control data generation, management and ownership?
- Adequately address privacy, compliance and security?
- Address interoperability challenges?

They will do it by...

- Aligning with agile, automation, workplace and digital transformation initiatives.
- Designing for and building in security from day one and insisting providers do the same.
- Using APIs and participating in industry standards efforts.
- Measuring and monitoring from the beginning.
- Recruiting, training and retaining skilled employees.
- Using experienced and trusted providers.
- Publicizing results.

Enterprise Experiences

ISG talked with representatives of two organizations with longtime experience using the IoT, discussing their requirements and the importance of a management platform. One deployment is in a smart city and the other is with a facilities management company.

Smart City

One smart city deployment in India, the Electronic City, Bangalore, is a township covering hundreds of hectares. The governing body of this largest industrial technology hub of Bangalore is a consortium of entities operating there, including large technology services companies. The governing group is responsible for all municipal functions including road management and improvement, water management, waste management, wastewater management and street lighting.

The goal of this and many smart city implementations is quality of life improvement for citizens. Any smart city is on a unique journey – one size does not fit all. Smaller cities with low budgets typically use a slower approach. Electric City wanted governance to be based on data collected and analyzed – and needed a common IoT platform for those purposes.

Starting small to prove the value of connected citizen services, those running the township added IoT devices gradually to accommodate and connect existing services. Independent systems and the applications were connected onto the common platform for waste management data collection analysis system, e-toilets monitoring and complaint tracking. Eventually, systems were added for ambulance tracking, managing road signals, auto parking, monitoring environmental conditions, accessing surveillance cameras, monitoring electricity and tracking vehicles. One major success of the implementation was the ability to expand it feature-by-feature based on priority needs for governing.



Success came because the township leaders started small, justifying additional services along the way so that they can now concentrate on adding broader services that tackle larger issues, because the team accomplished addressing the smaller service needs. Next, predictive analytics will help define what's next for new and improved services.

Dialog and continuous cooperation between the smart city and Wipro, the platform provider, enabled the township to take the best advantage of the IoT platform and meet custom requirements. The ability to easily connect the physical and digital via one platform helped demystify the implementation for the township leaders who don't want to be IoT experts to serve citizens.

For the city's platform, customization and scalability are critical, as it must support growing with additional application and city services. Continuous engineering support has also been key to making the needed changes while maintaining existing services. Electric City, therefore, benefits from this hub of innovation and expertise. Success has come despite a limited starting budget, and the organization has been able to demystify the smart city concept and grow the deployment.

Building and Infrastructure Management

Skanska, a global construction group, is incorporating digital services into its building and facilities management efforts. But why would they need any IoT capabilities? The company is seeing a shift in how its customers use building spaces that can be enhanced using IoT. While there's an expectation for improvements by using digital over time, some potential customers don't know how to achieve results. This puts the onus on the customer to define and reach specific outcomes.

Skanska provides services to customers with specific outcomes based on data, leveraging knowledge and insights for recommendations. The platform makes the connections to building devices easy and reliable.

For buildings, there are three key reasons for adding digital services and IoT devices:

- **Carbon performance:** Facilities managers seek improvements beyond design targets, especially energy performance.

- **Asset efficiency:** Reducing use of lighting and HVAC systems, for example, ensures maximum lifespan to reduce costs (SFG20 – the industry standard for building maintenance specifications in the U.K.).
- **Occupant productivity:** Digital services help provide optimum environments for people.

Skanska combines its building and facilities management expertise with digital connectivity to build systems to not only generate data but to predict and base outcomes on that data. For example, a shortage of oxygen versus CO₂ is a problem in high-rise glass buildings, particularly because traditional HVAC controls do not adapt to how the building is being actively used. But with temperature and CO₂ monitoring inside and out the building, the facilities team can decide whether to cycle in outside fresh air. Ambient noise levels can impair cognitive performance, so measuring that and making changes to the indoor environment based on that data can improve employee productivity.

An IoT platform is the core foundation of intelligent building services. The platform will serve other projects, including national infrastructure efforts in the U.K. for which there is a desire to build a national digital twin.

Challenges for any platform include lack of a data set with information in a usable format. Standards around the information sets are sometimes lacking or not used. In existing buildings, getting the needed data requires laser scanning a building and making an inventory of its assets to create a 3D model. While building information modeling (BIM) is a well-understood process for new construction, it is rarely performed on existing buildings. Second, while building digital information requirements are documented in various BIM standards, they are often rarely a priority or delivered inconsistently across new construction projects in the industry, despite it being straightforward to capture digitally from the beginning. For large-scale infrastructure projects, these data and digital information standards are readily available and often mandated.



Figure 4: ISG Future Workplace Market Framework



Source: ISG

IoT and the Future of the Workplace

Most of the enterprises that are recognizing higher-than-average revenue increases from their digital initiatives have undertaken regular assessment of their automation capabilities and their impact on their staff. These leading organizations are also processing and analyzing IoT data streams, and co-creating digital products with customers and partners.

Enterprises should consider how the IoT fits into the workplace. Tomorrow's organizations will focus

on the 12 capabilities outlined in the ISG Future Workplace Framework (see Figure 4) for creating a shared sense of purpose, a culture of collaboration and a way of tapping an ecosystem built specially to drive business value

While technology does not define the workplace of the future, it is a critical element – allowing an organization to attract the right talent, seamlessly bridge physical and digital workspaces, appeal to workers of different generations and integrate data into the decision-making process.



Summary

Enterprises that have adopted common technology platforms and data scientists as part of their development teams to handle IoT streams are generating a substantially higher incremental business value from their digital transformations.

Digital is the blending of the physical and virtual worlds using data, real-time data analysis, mobile devices, cloud, social media and sensors to create an interaction between a company and its customer as a context-aware experience. That is, the company uses information about the customer, their likes, desires and location, to deliver an experience in the customer's current physical

context. People prefer context-aware experiences. The right digital strategy can enable traditional companies to create these context-aware experiences.

In a digital experience, the flow of information is bi-directional – physical informs digital and vice versa. The intermediation of processes with data and technology makes information available in context.

The IoT supports enterprise digital transformation initiatives, so it needs to be integrated into them from the beginning and throughout, and the platform is the vehicle.

Sponsor Perspective



Impact of the Internet of Thing (IoT) on global business

The all-pervasive and ubiquitous Internet of Things (IoT) has made an indelible impact on our lives and business. The internet connected the world and the emergence of IoT further consolidated these connections.

Today, IoT is no longer just an emerging technology, but a game changer propelled by pandemic. IoT is enabling global businesses to build on the foundations of artificial intelligence, machine learning, big data and the cloud to unlock new possibilities for the future. The IoT connects billions of devices, giving businesses opportunity to enhance productivity, efficiency and innovation.

Leveraging IoT use cases for business transformation

As organizations across industries embark on digital transformation programs to engage with the digital economy, they are looking to connect physical assets with the IT ecosystem to increase

operational efficiency, optimize usage and improve asset reliability to generate new business opportunities. With sensors connected to equipment, machinery and various other assets, the IoT has found its place in use cases across industries. These connected assets are enhancing the potential to generate and utilize data, to leverage analytics and provide key business insights across operations and customers. In recent years, organizations have also realized benefits of cost efficiency, security, agility and collaboration through integration with cloud platforms and edge computing.

The manufacturing, energy, utility, retail and facilities management industries have been the most prolific users of IoT to realize its potential in business transformation. The pandemic has resulted in a new surge in the health and pharma sector. The most common use cases are in asset monitoring, management and predictive maintenance. IoT and other converging technologies have helped industries save millions on their assets and improved asset amortization by 10-20 percent.

For organizations in the B2C space, and those with large internal user bases, IoT is used for customer



or user experience transformation, resulting in changes to the way customer or employee satisfaction is approached. Smart cities are a classic example of how governments have leveraged IoT technologies to ensure citizens' convenience and safety and move cities up on the Livability Index. With fast-growing urbanization, IoT has produced several smart cities applications that have helped in decongesting urban traffic, improving energy efficiency, simplifying waste management and helping cities grow sustainably.

Some industries have mature systems like supervisory control and data acquisition (SCADA), manufacturing execution systems (MES), product lifecycle management (PLM), etc. to manage specific operations technology (OT) tracks. Most of these legacy systems have a silo approach that puts constraints on AI and analytics. Innovation in connectivity technologies, including the advent of IoT-specific connectivity technologies like LoRA, Sigfox, NBIoT and others, has helped blur boundaries and made data transmission easier at optimal cost. IoT solutions with associated strengths in connecting anything, anywhere, anytime, and with data consolidation, cross referencing, AI and advance analytics, have broken boundaries

The quintessential IT-OT convergence

Device connectivity with IoT enables organizations to offer better customer experience, increased operational efficiency and reduced time and effort. How can this be made possible? The answer lies in the convergence of information technology (IT) and operations technology. The convergence needs to bridge IT and OT data and platforms in near real-time so information can be harnessed as a virtual single system, enabling visibility and business process rigor across the organization. Today, the data flow between IT and OT has significantly increased, enabled by IoT technologies along with others that include in-memory databases, advanced integration methods, artificial intelligence, machine learning and analytics.

Traditionally, many customers have been taking their IoT decisions based on individual use cases. These decisions typically are taken by individual business units independently and are based on

their specific business problems. However, there are several challenges underpinning this problem-solving approach.

A siloed approach does little to foster organizational development and growth. Different departments have access to an incredible amount of data that can be managed, utilized and controlled much better to increase overall business functions. With a siloed way of working, a holistic view is lacking. Take the example of a large enterprise with a widespread footprint. A facilities manager's focus is on achieving low operational cost, low energy cost and smooth building operations. The security manager has priorities to ensure the safety and security of employees and visitors and the premises at large. Meanwhile, the HR manager's focus is on employee experience and ensuring that employee satisfaction for any interface with office functions and processes is at the highest level. Each of these units may have its individual systems, point solutions or varied solutions developed on standard platforms, disparate databases, etc.

One example how an integrated IoT approach helps achieve cross-functional goals is the use of occupancy sensors to help regulate lights and HVAC based on real-time occupancy. This reduces energy cost, helps the security manager to plan safety and security according to varying occupancy on different days and times, and also helps in improving employee experience by enabling workspace and meeting room booking based on real-time occupancy status.

In manufacturing, integration becomes even more complex. There are several systems deployed that could include SCADA, MES, logistics and supply chains management, warehousing systems and several others. Large manufacturing organizations are likely to have 50 or more different vendors for different technologies and databases. Managing these elements and ensuring return on investment is a challenge for CIOs and CDOs.

CIO's initiative: A strategic and programmatic approach to IoT

While business owners and leaders continue to be key stakeholders for IoT projects, CIO organizations are increasingly looking at IoT as a bigger initiative



across the organization. Most organizations have made significant investment in IoT-based technologies, but their lack of organization-wide IoT strategies prevents them from realizing the full potential.

There is a need for a strategic and programmatic approach in IoT initiatives, which means that organizations must take stock of actions already undertaken and craft the future roadmap for better business efficiency. Here, a platform-based approach plays an important role. This is not to imply a radical change, but a consolidation is recommended.

Some vendors offer the ability to seamlessly integrate across platforms. For example, **Wipro Smart i-Connect™**, our multi-domain, ready-to-deploy IoT solution, can be seamlessly integrated with any other platform. It works on premise, on edge and across clouds using native cloud features as well. This integrates devices and systems on varied new age and legacy protocols, connects with data lakes built on varied stacks and is enabled with edge AI and cloud-based advance analytics. For a CIO, better control constitutes a strong technical roadmap, an effective strategy and therefore larger benefits from the use cases, with cross references, cross linkages and analytics.

There are several benefits in adopting this approach. Operations can be simplified by consolidating vendors, and therefore, vendor management and technology costs will reduce. In addition, infrastructure technology consolidation with the option to choose the right base technology will benefit the organization in the long run. Last, but not least, it will improve the ability to drive outcomes. Today, we estimate that only 30 percent of IoT pilots see the world of production. This does not imply that the other 70 percent have failed; rather they have not been able to realize the envisaged benefits.

An integrated approach offers the ability to cut across service components, including systems, processes, data and applications. This ecosystem can deliver unprecedented efficiencies and innovation, but no single platform can encompass the length and breadth of IoT. While there are a variety of platforms that can handle device integration, aggregation, presentation, monitoring, controls and analytics, what is needed is a holistic and integrated approach to IoT implementation.

An integrated programmatic approach is not a one-time journey. Neither is it an inexpensive, quick fix solution. Organizations must conduct a thorough cost-benefit analysis of their current use cases. Then they can choose which initiatives they can migrate to a new environment. At some point, there may still be a smorgasbord of technologies, databases and point solutions. The idea is to have a long-term view of the expected benefits, aligned to the future strategic roadmap of the organization. Integration must be done, and links must be established. Take stock, make your strategies, and move in a programmatic, integrated, platform-based approach. Platform strategy should also address the types of devices, connectivity, security and management that are best for the environment.

Importance of operations technology or IoT service lifecycle management

The real promise of IoT lies in deriving sustained benefits from its solutions at a larger scale, not just from pilot projects and proofs of concept. This demands an effective service management framework around IoT solutions and operations technology at large. The framework needs to ensure smooth functioning of solutions, with sustained outcomes and continuous improvement in processes and solutions.

Think about how ITSM and the emergence of the managed services concept transformed the IT world. Proactive processes and procedures are now used to plan, design, deliver, and control IT service delivery to business users. The IoT world needs an evolved version of ITSM to manage its ever-increasing amount of connected nodes and data points. Some organizations, including ITSM/BSM tool vendors, are working to bring similar service management frameworks and tool sets into the OT and IoT world. For example, Wipro IoTnXT is an overall OT service lifecycle management framework with a set of tools and automation. It is used to ensure varied systems are monitored and managed across layers (device, connectivity, cloud, platform and applications) and provide service assurance on the overall solution.

Most IoT devices fail to have a neutral data aggregation layer or have limitations regarding



data formats or types of devices that can be integrated, making device manufacture or proprietary play a significant reason for failure. Integration of various systems across layers with proactive monitoring and a preventive, proactive and predictive approach is the key. This, combined with a universal service management tool that preferably works across IT-OT layers, helps in continuous improvement at optimal cost. It also helps ensure benefits are delivered as envisaged,

and that any improvisation required on systems, process and applications is affected suitably in time.

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For more information, visit <https://www.wipro.com/>

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