EXTERNETWORKS

‘VALUE CREATION’
THROUGH THE
INTERNET OF THINGS (IoT)

Innovation is a competitive advantage only when it is done smartly for business viability. Be smart with your innovation and ensure you have the right models in place to enable viable business results by creating value for your customers.

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TABLE OF CONTENTS

01. GENERAL VALUE CREATION PRINCIPLES 03

1.1. A Look at Value Creation in a Product Organization 05

1.2. Mapping the 'real value' of the IoT 06

1.2.1. General View of the IoT Value Creation 06

1.2.2. Cross-sector Impact of the Value Potential 07

1.2.3. Interoperability Impact of the Value Potential 09

1.2.4. Developing Countries' Impact of the Value Potential 09

1.2.5. Macro Expectations of the IoT Value Potential 10

02. HOW THE IoT TRANSFORMS BUSINESSES 11

2.1 Value of the IoT in Creating New Revenue Streams & Service Models 11

2.2 How Healthcare Industry is Harnessing the IoT 11

2.3 Value of the IoT in Building New Service Businesses of Companies 12

2.4 Convergence of the IoT & Enterprise Mobility Management (EMM) 12

03. THE TAKE-AWAY 13

04. HOW EXTERNETWORKS CAN HELP 14

05. REFERENCES 15

01 GENERAL VALUE CREATION PRINCIPLES

Before delving into how you can create value with the IoT, let's understand the common value-creation principles. Value creation lies at the core of any business model of an organization and should be a consistent instrument that:

- » enhances the value of your organization's offering
- » encourages your customers' willingness to pay.

A business that does not create value to maintain relevance in the evolving marketplace will eventually fail. For this reason, the business model of your organization must be clearly defined and kept central to the innovation process. Given the technology barrage hitting organizations, replicating popular frameworks and consolidating established business models will not suffice. To benefit from the new, cloud-based and IoT opportunities, you and your organization will have to primarily re-think value creation and value capture. Try to answer four basic questions in this thought process:

- » Who is your target customer?
- » What do you offer to your customer?
- » How is the value proposition created?
- » How is revenue created?

The answers will help you develop the right business model that will capture your primary business objective and how it integrates the organization's internal and external factors to create value. In essence, you will be able to set clear procedures as to how your central organization creates and captures value for itself and its various stakeholders within the ecosystem defined by your business model.

Management guru Michael Porter stipulates three generic strategies for value creation: differentiation, cost leadership, and focus. This is mostly adopted within the traditional organization model. For most organizations, this has been translated into value creation that is as simple as fixing the right price to maximize profits from various product sales. Margins are maximized to the extent that these organizations can leverage core capabilities in bringing products to market, and are able to establish control of key points in the value chain regarding patents, commodity costs and brand strength. With the IoT, a complete mindset shift is required to create and capture value. It requires going beyond these three strategies aimed primarily at your internal capabilities. Your lenses should go beyond your immediate in-house capability and incorporate the real-time impact of the end-user and partners in the ecosystem. The technology industry is a highly connected industry today and the drive is for more open systems, apps and API integration. This makes Porter's three strategies no longer mutually exclusive; rather, they can be mutually reinforcing in creating and capturing value. It is to your advantage to keep end-user and open systems on top-of-mind to create sustainable value in the world of IoT. See Table-1 for a summary of this shift in mindset.

> ***"A business that does not create value to maintain relevance in the evolving market place will eventually fail."***

01 GENERAL VALUE CREATION PRINCIPLES

[**Table-1**] : A SNAPSHOT OF MINDSET SHIFT REQUIRED FOR IoT VALUE CREATION

		Traditional Product Mindset	IoT Mindset
Value Creation	Customer Needs	Solve for current needs and lifestyle in a reactive fashion	Address real-time and emergent needs in a predictive fashion
	Offering	Independent product that becomes outdated over time	Product refreshes through over-the-air updates and has high synergy value
	Role of Data	Single point data is used for future product requirements	Information convergence creates the experience for current products and enables services
Value Capture	Path to Profit	Sell the next product or device	Enable recurring revenues
	Control Points	Potentially includes commodity advantages, IP ownership, and brand	Adds personalization and context; network effects between products
	Capability Development	Leverage core competencies, existing resources and processes	Understand how other ecosystem partners make money

Source: *www.smartdesignworldwide.com*

" Products can now be connected with other products, resulting in new analytics and novel services for more effective forecasting, process optimization, and customer care experiences."

01

GENERAL VALUE CREATION PRINCIPLES

1.1. A LOOK AT VALUE CREATON IN A PRODUCT ORGANIZATION

In conventional product organizations, creating value meant identifying enduring customer needs and creating well-contrived product solutions. Competition was largely based on features of competitive products. And when feature innovation ultimately proved to be too incremental, it would give rise to price competition, and later products would become archaic.

In a conventional product psyche, the customer needs assessments are focused on current needs, and production responds to customers' wants. This is typically done using historical data and trends. In the IoT, however, it becomes possible to address customer needs in real-time – with over-the-air updates – and with dynamic production methods that promote immersed customer experiences. Here real-time data is used to determine customer needs. Organizations who really focus on the customer take a primarily different approach. They focus on the customer by anticipating their needs with relevance and context, which opens up a new world of creating deeper, more personalized and more valuable relationships with their customers. The KPIs focus more on retention, satisfaction and creating lifetime value.

Moreover, products can now be connected with other products, resulting in new analytics and novel services for more effective forecasting, process optimization, and customer care experiences. A host of consumer products and services, ranging from Nest thermostats to Philips Hue light bulbs demonstrate several new possibilities for value creation based on the IoT. For instance, LIFX (pronounced LIFE-X) produces remotely programmable LED light bulbs that can be controlled through a smart-phone app. These bulbs, which are designed to last over 22 years with the brightest and most flexible smart light, are sold at a premium. They are sold at a price that is about 10 times higher than that of a Compact Fluorescent Lamp (CFL) bulb. From a consumer perspective, an important factor for buying such premium hardware products is the novelty factor that they can now control these independently operated devices remotely over linked systems.

Predictive analytics, self-learning algorithms and technology, coupled with data, create an integrated thread that fine-tunes customer interactions and experiences. This enables an organization to use real-time data to calculate and foresee customer needs, delivering the next-best product, service or experience for customers. What's truly important to customers is the ability of your organization to leverage transaction, interaction, product, call center, location and other behavioral data to learn, distill and customize responses for each customer. Instead of feeling that a product/service is being marketed to him, customers perceive experiences that revolve around their uncommon needs.

> ***"What's truly important to customers is the ability of your organization to leverage transaction, interaction, product, call center, location and other behavioral data to learn, distill and customize responses for each customer."***

The product offering in the past would have been an independent product that becomes obsolete in due course. In an IoT ecosystem, such products would be constantly updated, so that they do not become easily obsolete; and maintain the ability to easily synergize and link with other products, for enhaced utility. If done right, a sale of your product is not the end of the sales lifecycle but the start of constant engagement through regular over-the-air updates of new features and functionalities to your customer. You now have the ability to track products in use by your customer and be able respond to customer behavior with the desired value.

01

GENERAL VALUE CREATION PRINCIPLES

1.2. MAPPING THE 'REAL VALUE' OF THE IoT

Now that we are through with the principles of value creation, let's look at macro market levels as to where you can find the true value of the IoT for your organization.

1.2.1. GENERAL VIEW OF THE IoT VALUE CREATION

To date, the industrial and manufacturing industry have made good strides with the IoT by way of their machine-to-machine (M2M) adoption. This could be attributed to the nature of this industry to leverage sensors and geographically disparate tracking systems like RFID technology. What is different today is that, with the IoT, the level of intelligence and machine decision-making is becoming more enhanced, easy to access and prolific. The new frontier for value creation in this space is the auto manufacturing industry, where we see *frantic development with increasing experimentation for self-driving cars* underway.

On the other end of the spectrum, the consumer market, connected devices are well entrenched by way of wearables and fitness bands/devices, without consumers even realizing that they are a part of the IoT. This is similar to the use of connected home devices like the thermostat. Consumers have been using these systems separately in silos and now need to learn the value from the interconnectivity and interoperability of these systems. That is, your fitness band alerting your thermostat that you left the house triggering your heating/cooling system to shut off and save you some energy cost. So, while value can be created from new innovations, there is a huge untapped value within this space that could be unlocked just with the right consumer education. In line with this, we are seeing retailers like *Sears* and *Target* opening up real-life IoT experience centers, where consumers can learn about the value of the connected home. So value can be created through consumer awareness, integration platforms and deployment models.

In addition to this unawareness in the consumer space, verticals that lie within the spectrum between the consumer market and the sufficiently aware industrial market are in a state of hype overload. Most of these businesses are now trying to find their own position within the IoT. To this end, technology vendors are scaling up IoT businesses and creating strategies to help businesses design, execute, and manage complex systems. They are also working to bridge the gap between the ability to collect data from the physical world, and the capacity to capture and analyze it in a timely and meaningful way. Value can be created either by increasing revenues or enhancing productivity. Table-2 below shows the real economic value projections when IoT is leveraged to create business value.

[**Table-2**] : A QUICK VIEW OF THE ENORMITY OF THE IoT VALUE CREATION

	US$ Trillion
Total IoT value at stake	14.4
Savings from improved asset utilization	2.5
Revenues from improved employee productivity	2.5
Revenues due to improved supply chain and logistics efficiencies	2.7
ROI from faster innovation	3.0
Revenues from enhanced customer experiences	3.7

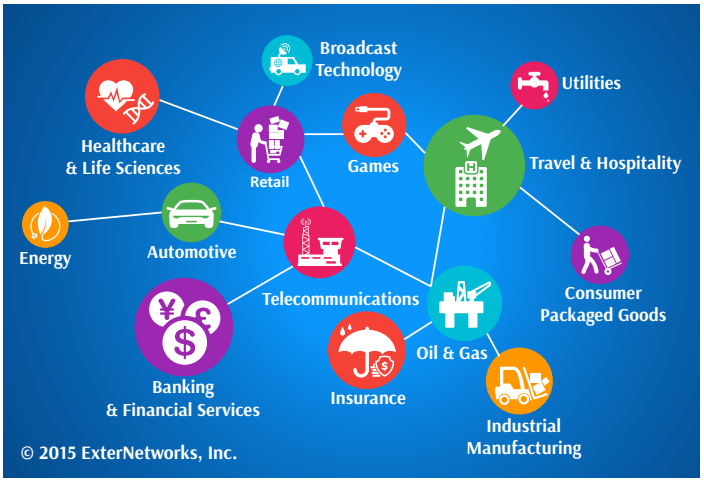
Source: www.cisco.com

01 GENERAL VALUE CREATION PRINCIPLES

While the numbers are attractive, harnessing the full potential of the IoT requires understanding of where real value can be created for your particular business. You must also be able to successfully address a set of systems issues, including interoperability. It requires certain conditions to be in place and overcoming the technical, organizational, and regulatory hurdles. Specifically, organizations that use the IoT technology will need better mechanism and approaches to distill wisdom and realistic information from the IoT data, most of which are not used today. It could take time for organizations to create systems that can optimize the IoT value and, more importantly, for management innovations, organizational changes, and new business models to be developed and executed.

1.2.2. CROSS-SECTOR IMPACT OF THE VALUE POTENTIAL

To understand the wider view of the potential benefits and challenges of the IoT, you have to view the IoT applications through the lens of the physical settings in which these systems will be deployed. Apart from analyzing the IoT uses in vertical industries, you should also consider settings such as cities and worksites. This will help you to know how various IoT systems can optimize value, particularly when they interact. According to McKinsey & Company, the potential economic impact of IoT applications in nine settings (home, offices, factories, worksites, retail environments, cities, vehicles, humans and outside) is expected to be nearly $11.1 trillion per annum in 2025 [see Table-3].



[Table-3] : CROSS-SECTOR IMPACT OF THE TOTAL VALUE POTENTIAL OF THE IoT ACROSS NINE SETTINGS

Settings	IoT Systems	US$ Billion
Home	Chore Automation & Security	200 – 350
Offices	Security & Energy	70 – 150
Factories	Operations & Equipment Optimization	1.2 – 3,700
Retail Environments	Automated Checkout	410 – 1,200
Worksites	Operations Optimization/Health & Safety	160 – 930
Human	Health & Fitness	170 – 1,600
Outside	Logistics & Navigation	560 – 850
Cities	Public Health & Transportation	930 – 1,700
Vehicles	Autonomous Vehicles & Condition-based Maintenance	210 – 740
TOTAL POTENTIAL VALUE OF THE IoT PER YEAR IN 2025		**3.9 – 11,100**

Source: www.mckinsey.com

01

GENERAL VALUE CREATION PRINCIPLES

1.2.3. INTEROPERABILITY IMPACT OF THE VALUE POTENTIAL

The value of the IoT impact, which includes the consumer surplus, would be equivalent to about 11% of the global economy in 2025; but to capture optimum value, interoperability between the IoT systems is crucial. On average, interoperability is required for 40% of potential value across the IoT applications and by nearly 60% in some settings [See Table-4]. Presently, most IoT data are not used. For example, in an oil rig having 30,000 sensors, only 1% of the data is examined. The data that are used today are mostly for irregularity detection and control, not optimization and prediction, which provide the greatest value.

[**Table-4**] : THE IMPACT OF INTEROPERABILITY BETWEEN THE IoT SYSTEMS IN ENHANCING VALUE

Settings	Value Potential Requiring Interoperability ($ Trillion)	Percentage of Total Value	Examples of How Interoperability Enhances Value
Factories	1.3	36	Data from different types of equipment used to improve line
Cities	0.7	43	Video, cell phone data, and vehicle sensors to monitor traffic and optimize flow
Retail Environment	0.7	57	Payment and item detection system linked for automatic checkout
Work Sites	0.5	56	Linking worker and machinery location data to avoid accidents, exposure to chemicals
Vehicles	0.4	44	Equipment usage data for insurance underwriting, maintenance, pre-sales analytics
Agriculture	0.3	20	Multiple sensor systems used to improve farm management
Outside	0.3	29	Connected navigation between vehicles and GPS/traffic control
Home	0.1	17	Linking chore automation to security and energy system to time usage
Offices	Less than 100 billion	30	Data from different building systems and other buildings used to improve security

Source: *McKinsey Global Institute Analysis*

01

GENERAL VALUE CREATION PRINCIPLES

Interoperability will significantly enhance performance by integrating sensor data from several machines and systems to provide decision-makers with a holistic view of performance across a complete factory or oilrig. According to McKinsey's research, more than half of the possible issues that can be diagnosed by predictive analysis in such environments require data from multiple IoT systems. Oil and gas experts interviewed by McKinsey for the research estimate opined that interoperability could improve the effectiveness of equipment maintenance in their industry by 100-200%.

With the IoT, you can't think of an organization in a vacuum. The market bundle is deeper than conventional products; you have to think about how your organization will monetize your product, and how your product will allow others to generate and amass value.

Interoperability will significantly enhance performance by integrating sensor data from several machines and systems to provide decision-makers with a holistic view of performance across a complete factory or oilrig.

1.2.4. DEVELOPING COUNTRIES' IMPACT OF THE VALUE POTENTIAL

Another area businesses should look at for real value of the IoT is in developing countries; as there is a huge potential there. Over the next decade, McKinsey estimates that there would be a higher potential value for the IoT in advanced countries because of higher value per use. However, nearly 40% of value could be generated in developing countries [See Table-5].

[Table-5] : PERCENTAGE OF IoT VALUE CREATED IN ADVANCED COUNTRIES VIS-A-VIS DEVELOPING COUNTRIES

Settings	Advanced Countries (%)	Developing Countries (%)
Human	89	11
Home	77	23
Retail Environment	71	29
Offices	75	25
Factories	57	43
Worksites	54	46
Vehicles	63	37
Cities	62	38
Outside	56	44
Total	**62**	**38**

Source: *McKinsey Global Institute Analysis*

"Over the next decade, McKinsey estimates that nearly 40% of IoT value could be generated in developing countries."

01

GENERAL VALUE CREATION PRINCIPLES

1.2.5. MACRO EXPECTATIONS OF THE IoT VALUE POTENTIAL

It is expected that customers would capture most of the IoT benefits. The users of IoT, including business enterprises, other organizations, and consumers, could capture up to 90% of the value IoT applications create. For instance, remote monitoring of chronic disease patients could lead to their improved health, whose value could be as much as $1.1 trillion per annum in 2025. B2B applications can create more value than absolute consumer applications. While it is true that consumer applications such as fitness monitors and self-driving cars can attract maximum attention and create significant value, B2B uses can generate nearly 70% of potential value enabled by the IoT.

"The users of IoT, including business enterprises, other organizations, and consumers, could capture up to 90% of the value IoT applications create."

An enterprising industry is evolving around the IoT technology. Akin to other technology waves, there are opportunities for both the existing and new players. Digitization reduces the distinction between technology and non-technology companies. For instance, manufacturers of industrial goods are creating new business models by using IoT links and data to offer their products as a service.

To ensure that the full potential of the IoT applications is harnessed, technology has to continue evolving, minimizing the costs and providing more powerful data analytics. In almost all settings, the IoT systems raise questions about data security and privacy. If your organization wishes to take advantage of the IoT opportunity, your leaders will have to truly embrace statistical decision-making.

" B2B uses can generate nearly 70% of potential value enabled by the IoT. If your organization wishes to take advantage of the IoT opportunity, your leaders will have to truly embrace statistical decision-making."

02 HOW THE IoT TRANSFORMS BUSINESSES

Having looked at all these numbers and value creation avenues, it is worthwhile for us looking at a few real-world examples in which IoT is being leveraged to transform operations and bring value to businesses.

The strong blending of the digital and physical worlds is creating a paradigm shift that is fundamentally changing the business dynamics. The ability to be connected 24x7, in real time, with your customers, suppliers, and partners not only transforms the way you operate and interact, but also transforms the way you generate money for your organization. Organizations can now continue to add additional benefits and enhance the user-experience throughout the product lifecycle. This results in a shift in business value from products to the services they enable, which happens on a large scale. Despite the hype and hoopla around IoT, it has become a proven solution that is helping businesses turn more agile, generate greater profits and fortify customer relationships. IoT is also creating a new generation of businesses that are able to bring their innovative ideas to life more swiftly and effortlessly.

> ***" The ability to be connected 24x7, in real time, with your customers, suppliers, and partners not only transforms the way you operate and interact, but also transforms the way you generate money for your organization. "***

2.1 VALUE OF THE IoT IN CREATING NEW REVENUE STREAMS & SERVICE MODELS

In October 2014, AirWatch and Jasper announced a partnership to help enterprises incorporate connected objects into their secure business environments. Airwatch is a subsidiary of Vmware and provides mobility services to business enterprises to effectively manage and secure mobile devices utilized by corporate employees. Jasper delivers a standardized IoT operating service platform for business enterprises offering mobile or enterprise service.

2.2 HOW HEALTHCARE INDUSTRY IS HARNESSING THE IoT

IoT to the rescue! By leveraging IoT capabilities across a host of treatment scenarios, the healthcare industry is reducing hospitalizations and limiting the risk of death. Patient care is becoming personalized, immediate and cost-effective. According to the Center for Disease Control and Prevention Prescription, non-adherence to medication constitutes about 125,000 deaths per annum in the US. Glowcap, a dosage-monitoring pill caps, produced by Vitality, are helping doctors save lives by tracking if patients are adhering to their medication.

While treating life-threatening diseases, every second matters. St. Jude Medical, a global leader in medical technology, based in Minnesota, US, provides innovative, cost-effective medical technologies that transform the treatment of some of the world's most expensive epidemics. It uses USB adapters for implantable cardiac devices that remotely report patient data. The sensor, via cellular network, securely transmits information directly to the patient's doctors, who can monitor patient conditions and intervene immediately as required. The results of remote patient monitoring are evidenced by reports from a similar use-case from Boston Scientific – its remote patient management system showed a 33% relative reduction in the risk of death in patients, who were remotely monitored, compared with unmonitored patients.

The above-mentioned companies recognized that the IoT isn't about products, but about service. They are utilizing the IoT to get closer to their customers, communicate in real time and continuously deliver value-added services that have a real impact on people's lives.

02

HOW THE IoT TRANSFORMS BUSINESSES

2.3 VALUE OF THE IoT IN BUILDING NEW SERVICE BUSINESSES OF COMPANIES

The most important and indispensable asset for any organization is human capital. Organizations have invested much money in enhancing employee productivity and now IoT can help them innovate in multiple ways that have a positive impact on their bottom line.

Konica Minolta, a Japanese technology company, headquartered in Marunouchi, Chiyoda, Tokyo, offers connected copiers that perform remote diagnostics, automate service calls and re-order depleted supplies. They can also track the use to enable pay-per-use business models, wherever it makes business sense.

Jet engines, powered by GE, ensure flights follow the stipulated schedule. As soon as a flight reaches the gate, sensors in the engines convey the necessary information to the service teams to resolve any issues. Moreover, regular surveillance of precautionary maintenance maximizes human resources, shortens maintenance costs, and increases the lifespan of the engine. Measures such as these help avoid more than 60,000 delays and cancelations annually, saving the aviation industry more than $8 billion in annual operational costs.

"The most important and indispensable asset for any organization is human capital. Organizations have invested much money in enhancing employee productivity and now IoT can help them innovate in multiple ways that have a positive impact on their bottom line."

2.4 CONVERGENCE OF THE IoT & ENTERPRISE MOBILITY MANAGEMENT (EMM)

EMM is the end-to-end management of business mobile phones and tablets. Traditionally, it has been focused on the device – the settings, the applications, and the content. However, it must also include the management of the mobile services – the costs, service availability, and security. The IoT leverages connected mobile devices to deliver unique services in the market.

Organizations offering IoT services are confronting the same IT challenges as that of EMM for their business mobile phones and tablets. Most of the IoT services are delivered through the same connected tablets and phones that are used by business employees. For instance, mounted tablets are being used in fleet management and mobile phones are being used as scanners and taxi services.

The convergence of EMM and IoT enables organizations' wider control and visibility over their connected devices in the organization, and enables them make smarter, real-time operational decisions. With collaboration of Jasper and Vmware, such capabilities are delivered with benefits such as automated controls to oversee, plan, manage and secure connected devices, accelerated success of their IoT service businesses, new business models and global scale.

03

THE TAKE-AWAY

The IoT has transformative potential for many types of organizations and stakeholders. Technology suppliers have a unique opportunity to develop new and valuable systems, and create new sources of revenue and streams of business. Businesses that embrace IoT systems can enhance operations and garner greater insights for statistical decision-making; some will have the opportunity to build novel businesses with the IoT technology and data. Consumers will benefit the most – perhaps additional years of life from the IoT health applications and safer transportation, greater convenience and timesavings, and economical goods and services.

> ***" Corporate users of the IoT technology will need to change their systems and organizations to make the most of the IoT. They will need to invest in capabilities, culture,and processes as well as in technology. "***

To build competitive advantage in the IoT market, technology suppliers will need to create distinctive technology, distinctive data, software platforms, or end-to-end solutions. Those that fail to do so will confront the risk of commoditization and loss of business.

Corporate users of the IoT technology will need to change their systems and organizations to make the most of the IoT. They will need to invest in capabilities, culture, and processes as well as in technology. Businesses that fail to do so will lag behind their competitors and fade away into oblivion. Smaller firms, to compete with the larger companies, will need to find avenues to procure data on par with the larger companies, which will have access to sufficient data in-house.

While consumers stand to gain the greatest benefits from the IoT, they will have to balance potential benefits with privacy concerns.

They can gain access to an unknown amount of information about themselves and the world around them that can improve their quality of lives. But consumers will have to be perceptive about how they use that information and with whom they share it.

Finally, policy makers and governments will have to ensure that these new systems are safe and that IoT data are not being stolen or abused. They can help to balance the needs for privacy and protection of private data and intellectual property with the demands of national security. With critical infrastructure connected to the internet, security threats will proliferate, which governments will need to address successfully. Policy makers also have an important role in enabling the IoT by leading and encouraging standards that will make interoperability and widespread adoption possible.

04

HOW EXTERNETWORKS CAN HELP

As the demand for connected devices increases within the IoT, Managed Services Providers (MSPs) can help businesses become IoT ready (#IoTReady). The objective is to enable you to leverage IoT technologies to:

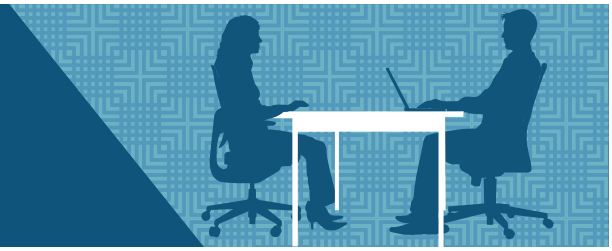
(1) Make innovative products and services for new revenue streams

(2) Develop business models for production and operational efficiencies that delivers scale and net cost savings

(3) Maximize performance while staying secure.

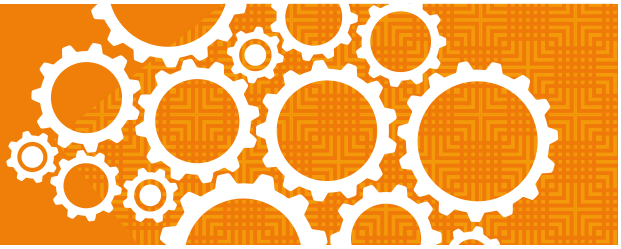
EXTERNETWORKS DELIVERS CUSTOMIZED SOLUTIONS FOR IoT-READINESS:

CONSULTING & PROFESSIONAL SERVICES



Tailored approach that cut through the hype and laser-focus on the right IoT technology makeup that aligns to your business objectives. We will assess the health of your current infrastructure to ensure you have the right capacity and security framework to thrive in an IoT world. You will get a comprehensive systems design and operational recommendations to ensure you derive optimal ROI from IoT adoption.

SYSTEMS INTEGRATION



Leverage our manpower and wealth of technology expertise to deploy your IoT systems. We are vendor agnostic and integrate across multiple platforms with an objective to give you a seamless operation across your entire infrastructure. This way you get optimal performance, the best quality of experience and business results.

MANAGED SECURITY SERVICES (MSS)

Use our world-class network operations center (NOC) sophisticated monitoring and management tools to ensure 24x7 service uptime. Our MSS includes 24x7 monitoring and management, overseeing upgrades, performing security assessments and security audits, and responding to emergencies.

05

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THANK YOU

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