

A Forrester Consulting
Thought Leadership Paper
Commissioned By Huawei
October 2017

Leverage Cloud-Native IoT Software Platform To Accelerate Digital Transformation

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Project Director:

Yini Song,
Senior Market Impact Consultant

Contributing Research:

Forrester's Enterprise
Architecture research group

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Executive Summary

Relationships with customers are becoming increasingly digital, and so are companies' products and operations — and that has sparked companies in every industry to embrace digital business transformation. Companies in the telecommunications (telco) space are looking for internet-of-things (IoT) solutions to bridge the physical and digital worlds, ingesting information and context through sensors from the physical world into the digital and taking actions in the physical world via actuators based on digital insights.

However, IoT technologies are complex and diversified in maturity and capabilities among different vendors, making it a struggle for technology decision makers to help their business execs take advantage of their transformational potential. Besides, cloud-native applications powered by containers provide business and architectural benefits, shaking up cloud platforms from infrastructure to middleware.

In June 2017, Huawei commissioned Forrester Consulting to evaluate the adoption trends of IoT across the globe. Forrester conducted an online survey of 203 telecom organizations in China, Japan, Korea, and Europe to explore this topic. We found that an IoT software platform with comprehensive capabilities is critical for telco carriers and service providers to accelerate digital transformation.

KEY FINDINGS

- › **IoT is key to digital transformation.** IoT is playing a critical role to accelerate digital transformation and achieve strategic outcomes. More than 80% of telco players consider that IoT is important or critical for them to improve customer experience, increase business agility and time-to-market, and get ready for the digital disruption. All interviewed companies have IoT initiatives in different stages from planning to implementation.
- › **Technology complexity impedes enterprise IoT adoption.** IoT has huge differences from machine-to-machine (M2M), which include integration complexity, infrastructure elasticity, and standard fluidity from a technical perspective, as well as application agility and innovation enablement from a business perspective. Over 60% of telco players realize these differences; however, they must address many critical challenges in the three dimensions of network evolution, business development, and long-term competitiveness.
- › **Companies in the telco space must build an IoT platform to accelerate digital transformation.** This platform spans five layers, including a connectivity layer, security layer, management layer, compute and analytics layer, and application layer. Over half of surveyed companies flag comprehensive capabilities on all five layers as the key priorities of their business agendas.

IoT Is Key To Digital Transformation

Digital businesses win, serve, and retain customers by continuously creating and exploiting digital assets to simultaneously deliver new sources of customer value and increase their operational agility.¹ The transformation toward digital business requires changes of every aspect of your business from digital touchpoints to operational excellence. In the telco space, emerging technologies like IoT are playing a critical role in accelerating digital transformation and achieving strategic outcomes. We found that:

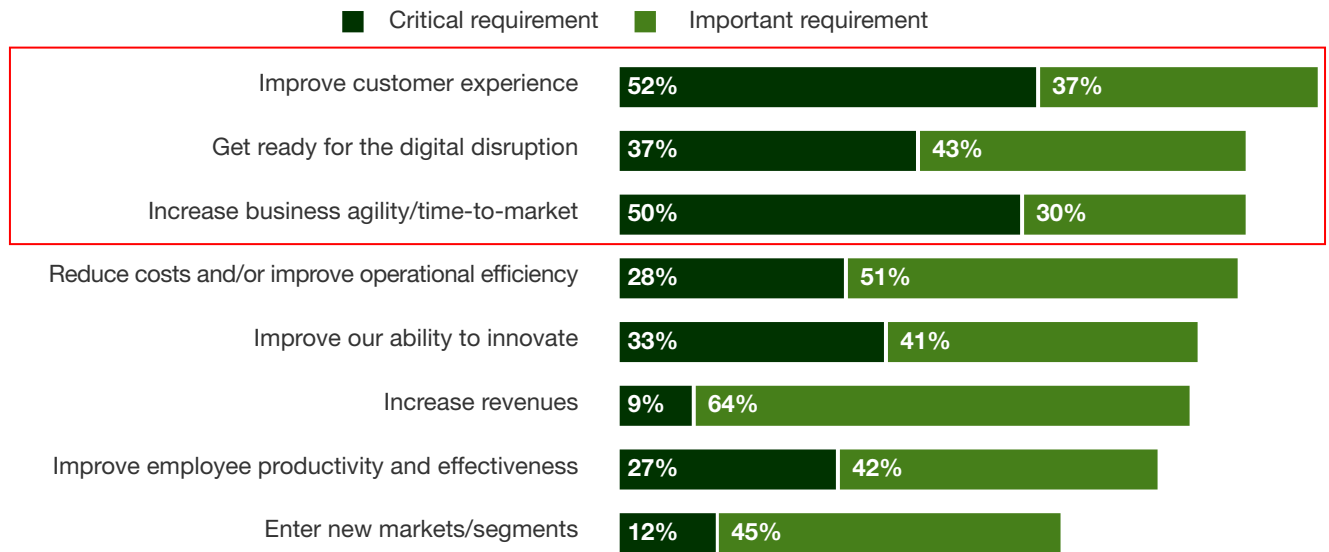
- › **No industry is immune to digital disruption.** Digital has transformed the market context for every business across different verticals including the telecom industry. The whole value ecosystem of your business, including your customers, your channels, your suppliers, and your technology partners, is becoming digital, and the pace of change is accelerating. It also disrupts you from within, changing the way you design products and services, generate insights, and run business operations.²
- › **IoT technology is critical for business digitization.** Among 203 IoT decision makers in the telco space across the globe, more than 80% of them consider that IoT is important or critical for them to improve customer experience, increase business agility and time-to-market, and get ready for the digital disruption. With IoT they can also gain competitive benefits in many other areas, such as cost savings, operational efficiency, innovation capabilities, revenue generation, employee productivity, and market penetration (see Figure 1).
- › **Visionary companies are proactively planning IoT initiatives to drive digital transformation.** All of the interviewed enterprises in the telco space have been more or less involved in IoT initiatives. Eighty-three percent of telco carriers are implementing or expanding their IoT solutions or applications, 10% of them are in the pilot stage, and the rest (7%) are planning to implement in the next 12 months. The other two telco forces are also catching up — 49% and 61% of virtual network operators and value-added telco service providers respectively are in the pilot or planning stage for their IoT initiatives.



Customer experience, digital readiness, and business agility are the top business priorities where IoT is playing a key role.

Figure 1

“How important are your organization’s current or planned IoT initiatives to your business priorities?”



Base: 203 IoT decision makers in China, Japan, Korea, and Europe

Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Technology Complexity Impedes Enterprise IoT Adoption

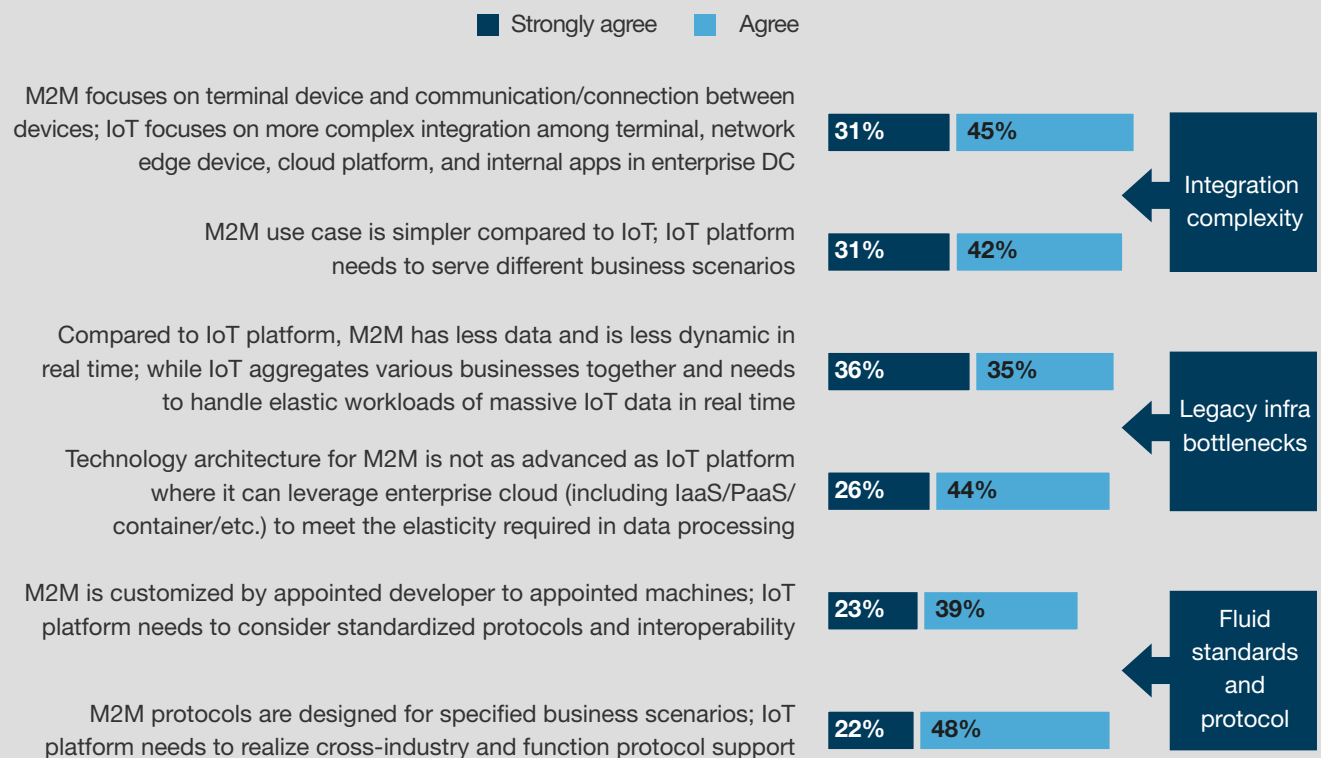
IoT can help telco companies differentiate digital business experiences and achieve digital operational excellence, and telco players have already accumulated substantial experience in M2M initiatives in the past. However, strategy leaders and visionary practitioners in the telco space are still facing critical challenges on their journey of IoT adoption because there are several major differences between M2M and IoT, and the technology complexity of IoT itself further impedes telco companies from IoT adoption.

IOT TECHNOLOGY IS DIFFERENT FROM YOUR OLD-SCHOOL M2M BY NATURE

Major differences between traditional M2M and emerging IoT lie in four areas across both technology and business domains, including integration complexity, infrastructure elasticity, and standard fluidity from a technical perspective, as well as application agility and innovation enablement from a business perspective (see Figure 2 and Figure 3).

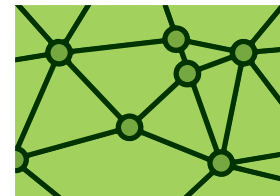
Figure 2

“Regarding the technology differences between M2M and IoT that possibly challenge IoT deployment, to what degree do you agree with the following statements?”



Base: 203 IoT decision makers in China, Japan, Korea, and Europe
 Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

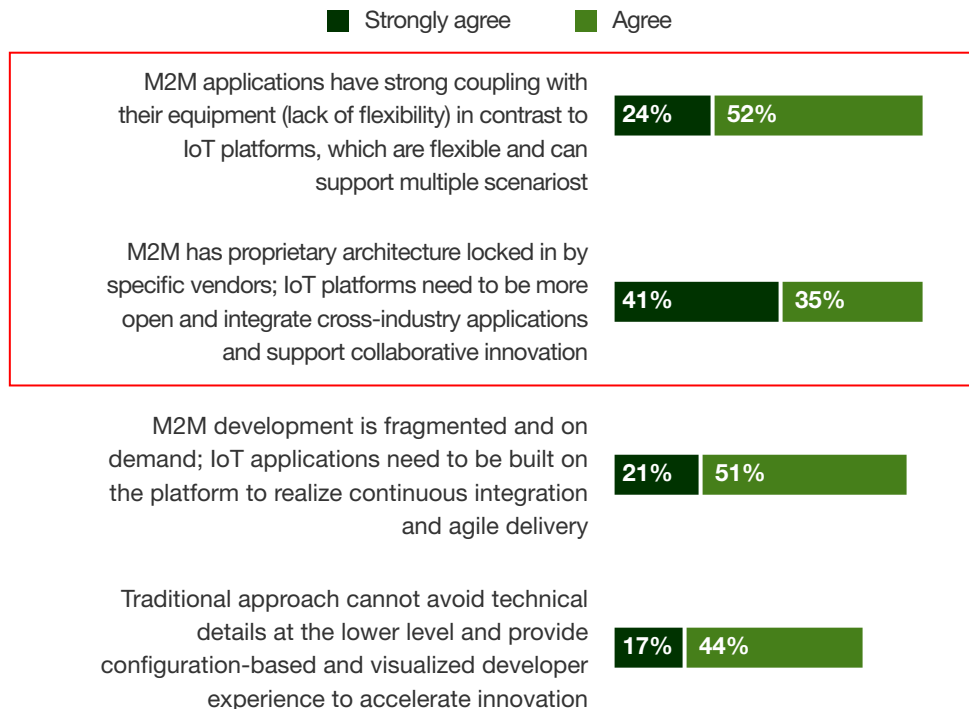
- › **The integration complexity across edge devices and enterprise networks challenges IoT deployment.** First, M2M normally focuses on terminal devices as well as communication and connection between devices, while the focus of IoT is on a more complex integration amongst terminal devices, network edge devices, cloud platforms, and enterprise internal applications. Second, M2M use cases are simpler compared with IoT platforms, which need to serve different business scenarios. Therefore, as depicted in Figure 2, 73% of telco companies agree that the integration covers diversified scenarios, which is the highest among all differences between M2M and IoT.
- › **Legacy technology infrastructure cannot handle elastic workloads of massive IoT data.** Seventy-one percent of IoT decision makers agree that M2M has less data to transmit and process as compared with IoT scenarios; the data traffic over IoT networks is not only massive and much more dynamic, but it also needs to be processed in real time or near real time for instant decision making. And the traditional technology architecture for M2M is not as advanced as an IoT platform, as the latter one can leverage enterprise cloud platforms, which might include infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), or even container-based cloud-native capabilities, to meet the elasticity requirements in data processing for modern applications.
- › **Fluid standards and protocols confuse technology decision makers.** M2M solutions normally only work for very limited use cases and specific business scenarios; therefore, they are customized by appointed developers for specific machines or equipment. However, IoT platforms must be able to handle different business contexts and exchange value among a broad range of devices. As a result, they must either consider standardized protocols to achieve interoperability or provide integrated support for a series of fast-evolving protocols and standards targeting respective back ends. As shown in Figure 2, 62% of interviewed stakeholders agree that it's a big difference in between.
- › **The traditional approach doesn't have the agility and collaboration support for fast innovation and monetization.** Agility and collaboration are the top two business differences that telco players are facing between M2M and IoT as demonstrated in Figure 3, each accounting for 76% of IoT decision makers. First, M2M applications have strong coupling with their equipment, lacking flexibility, while IoT platforms in good design can fit into diversified business scenarios. Second, M2M has specialized architecture by appointed developers, whereas IoT platforms not only need to be more open but should also integrate cross-industry applications and support collaborative innovation.



Integration complexity, legacy infrastructure bottlenecks, and fluid standards and protocols are the key technology differences between M2M and IoT.

Figure 3

“Regarding the business differences between M2M and IoT that possibly challenge IoT deployment, to what degree do you agree with the following statements?”



Base: 203 IoT decision makers in China, Japan, Korea, and Europe

Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Application agility and innovation enablement are the key business differences between M2M and IoT.

TELCO PLAYERS MUST ADDRESS THREE KEY CHALLENGES TO TRANSFORM FROM M2M TO IOT

There is no shortcut to bridge the gap between M2M and IoT. On their journey of IoT adoption, companies in the telco space must address critical challenges in three dimensions: network evolution, business development, and long-term competitiveness.

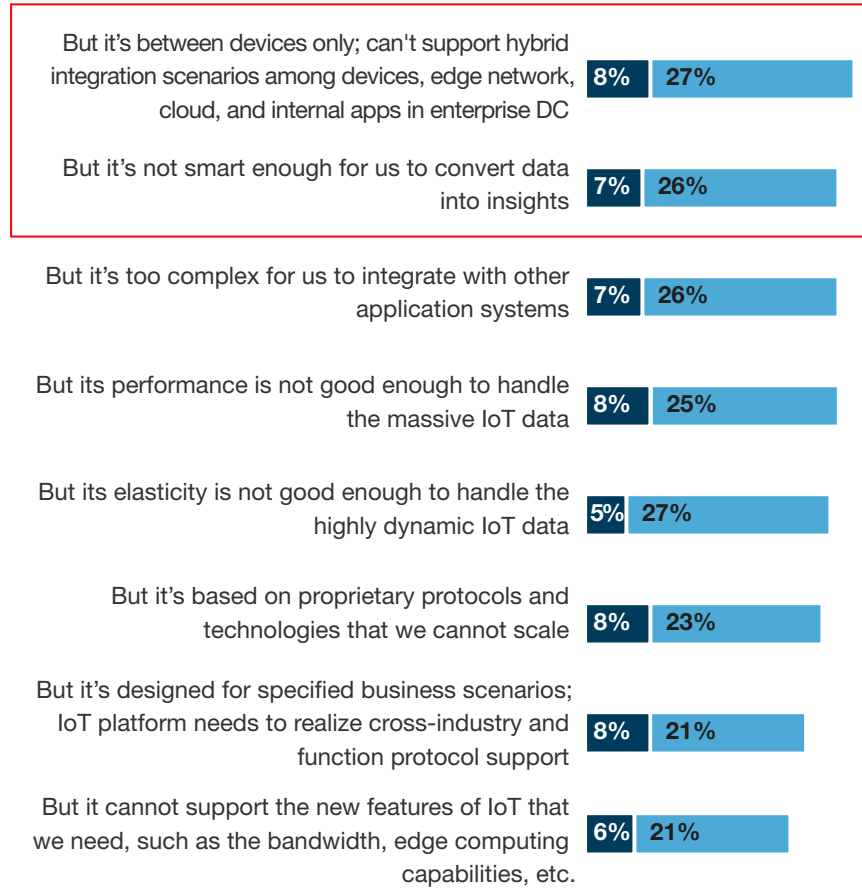
- › **Challenges for IoT network evolution.** As depicted in Figure 4, over one-third of telco decision makers cite hybrid integration and insights generation capabilities as the top challenges to transform an M2M network into an IoT network. An M2M network is between devices only. Telco players with significant infrastructure resources, which might be running well for M2M scenarios, must achieve hybrid integration to interchange data among devices, edge networks, cloud, and internal applications within enterprise data centers. To achieve this, it's crucial to have comprehensive support for both telco and nontelco protocols. In addition, it's also important that telco companies continuously improve their capabilities to generate insights effectively out of massive amounts of data.
- › **Challenges for IoT business development.** As shown in Figure 5, approximately half of the IoT decision makers flag competitive market insights, operational technology capabilities, and contextual business knowhow as the top three areas in which they are facing challenges for business development once an IoT network is in place. They also want to know how to transform their application delivery approach as well as how to evaluate the maturity of different solutions. IoT decision makers must understand that there are no “killer” applications in IoT adoption for telco companies to rely on, nor is there a silver bullet that telco players can use to overcome the barrier. Instead, IoT decision makers must focus on the ecosystem and customer insights to provide differentiated products and services and accelerate digital innovation, which is also challenging 39% of interviewed companies.
- › **Challenges for IoT long-term competitiveness — partnership with over-the-top (OTT) vendors.** Traditional telecom service providers have been concerned about the disruption of OTT players. However, in the IoT market, telco players should focus more on collaborative innovation rather than tit-for-tat competition by leveraging the strengths of both sides to drive sustainable business growth. For example, telco carriers have rich experience in telco network and protocols with extensive hardware infrastructure and customer data in the telecom domain, while OTT companies, many of which are born digital, normally have elastic infrastructure to handle dynamic workloads over the internet, with user data and operational insights into specific domains. The key challenge is how to build this partnership with OTT players, and over one-third of respondents will need help from IT service providers as reflected in Figure 6-1.
- › **Challenges for IoT long-term competitiveness — partnership with homegrown IoT practitioners in other verticals.** For enterprises in other verticals that want to build IoT by themselves, it doesn't necessarily mean that there is no opportunity for telco players at all; instead, telco players can also partner with these enterprises, which have vertical expertise, customer insights in specific business segments, and experience in hybrid integration as well as nontelco network protocols. However, again, the key challenge for telco players is how to establish win-win partnerships with these enterprises, and 35% of them will also need help from IT service providers as reflected in Figure 6-2.

Figure 4

“Regarding network evolution challenges that you might be facing toward your IoT adoption, to what degree do you agree with following statements?”

We already have an M2M network as a start for IoT adoption . . .

■ Strongly agree ■ Agree

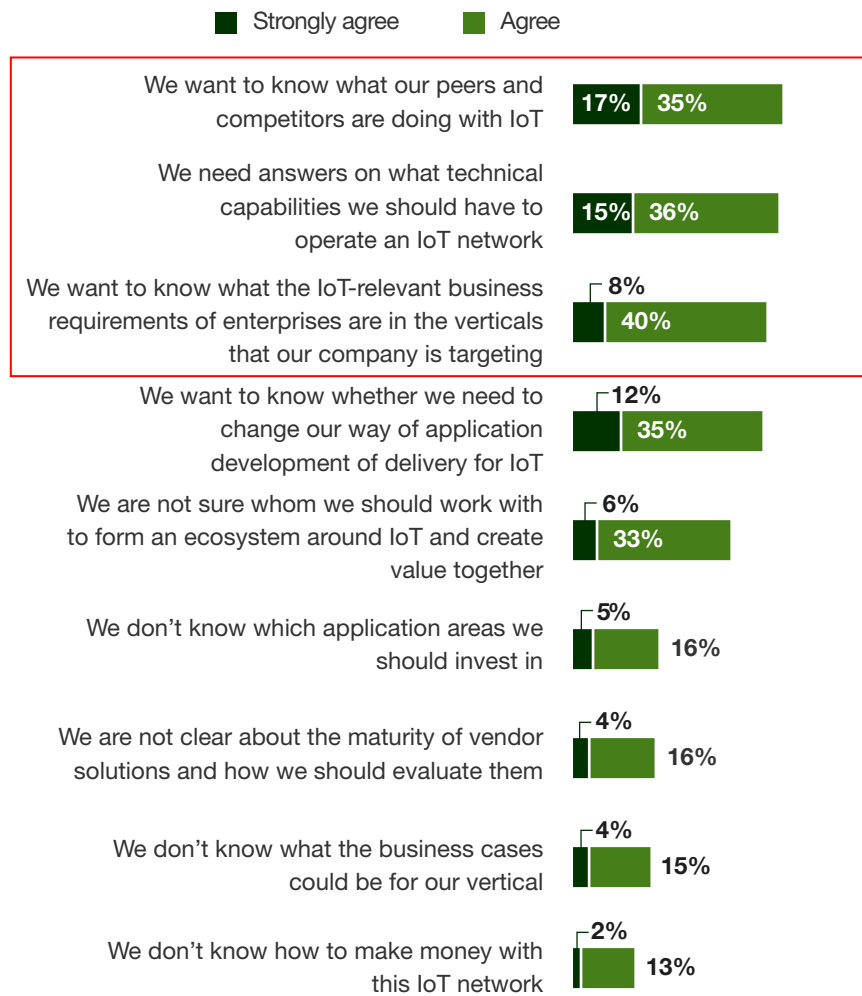


Hybrid integration and insights generation capabilities are top challenges for network evolution.

Base: 203 IoT decision makers in China, Japan, Korea, and Europe

Figure 5

“Let’s assume that you already have an IoT network in place. Regarding the business development challenges that you might be facing, to what degree do you agree with the following statements?”

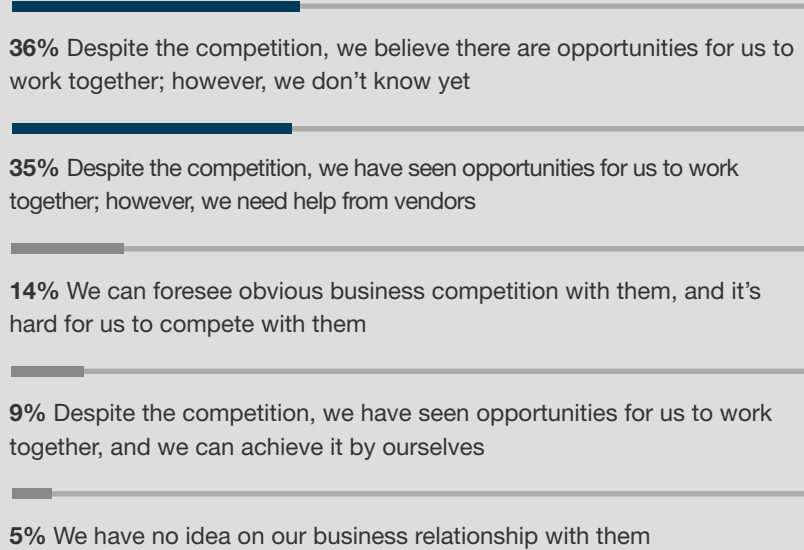


Competitive market insights, operational technology capabilities, and contextual business knowhow are the top three areas in which telco players are facing challenges for business development.

Base: 203 IoT decision makers in China, Japan, Korea, and Europe
Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Figure 6-1

“Regarding the challenges to maintain long-term competitiveness, thinking about OTT vendors, which statement best reflects your current thoughts?”

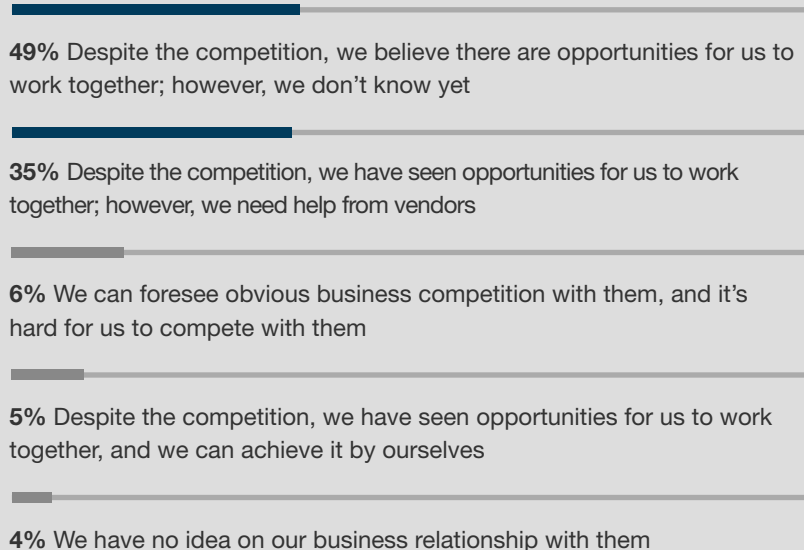


Base: 203 IoT decision makers in China, Japan, Korea, and Europe
Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Partnerships with OTT vendors are challenges to telco players for long-term competitiveness.

Figure 6-2

“Regarding the challenges to maintain long-term competitiveness, thinking about enterprises in other verticals that want to build IoT by themselves, which statement best reflects your current thoughts?”



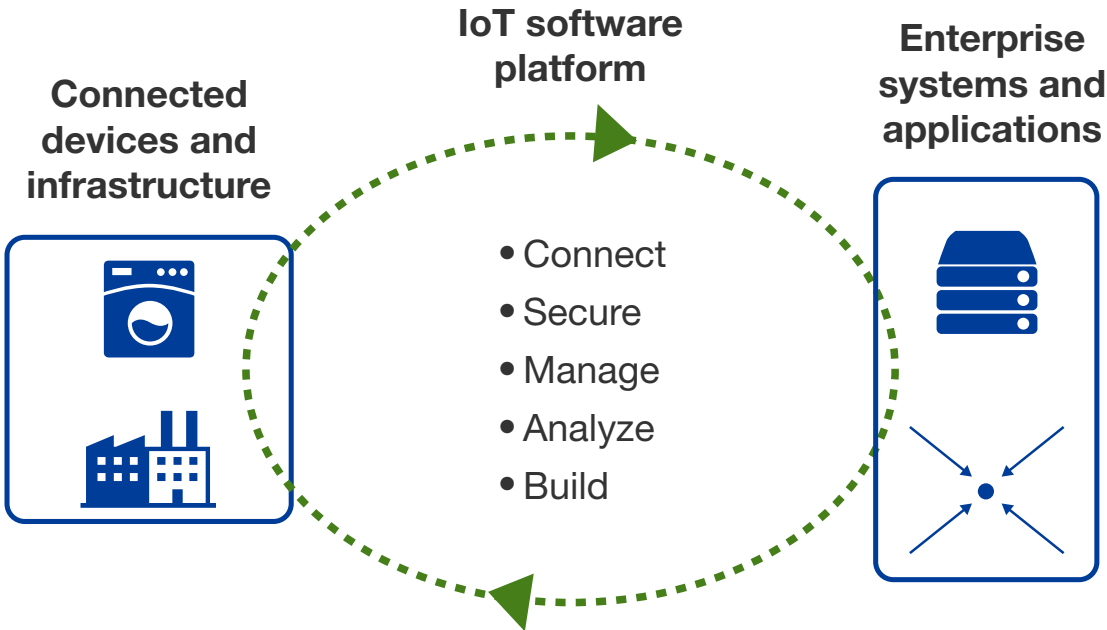
Base: 203 IoT decision makers in China, Japan, Korea, and Europe
Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Partnerships with homegrown IoT practitioners are also a key challenge for telco players to achieve long-term competitiveness.

Building IoT Platforms To Accelerate Digital Transformation

To simplify deploying, managing, controlling, and automating connected products and accelerate digital transformation, telco players must build IoT platforms and overcome the challenges on the digital journey. Forrester defines an IoT platform as the integrated solutions that connect to and manage smart devices and infrastructure in order to integrate operational data and control into business and customer processes.³ This platform spans five layers, including the connectivity layer, security layer, management layer, compute and analytics layer, and application layer (as reflected in Figure 7). Each layer delivers specific business value to tackle the challenges during the transformation from M2M to IoT.

Figure 7 Five Layers Of IoT Software Platform



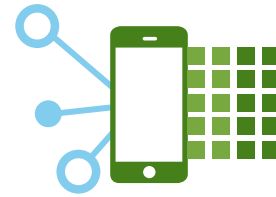
Source: "Internet-Of-Things Software Platforms Simplify Transformation Of Business Operations," Forrester Research, Inc., April 2, 2015

THE CONNECTIVITY LAYER ENSURES ADAPTIVE CONNECTIONS AMONG DEVICES AND NETWORKS

The connectivity layer spans devices, networks, and management platforms, laying the foundation for interoperable communications among all parties. This layer mainly addresses three key challenges: 1) connectivity is the technical infrastructure of hybrid integration; therefore, it's key to improving integration capabilities; and 2) the device-side heterogeneous integration capability is a technical difficulty among the whole architecture; therefore, it's one key area to differentiate the IoT platform; 3) protocol support is an essential element of connectivity, which should cover different network types; therefore it's key to address the challenge of lacking protocol support.

The key elements on this layer include the IoT device operating system (IoT device OS), IoT chips, and the connectivity support within the IoT network and management platform, which consists of IoT communications, software, and interoperability protocols, as well as cloud integration flexibilities and industry-specific interfaces (see Figure 8).

- › **Connectivity on devices (IoT device OS and IoT chips).** An IoT device OS runs on edge devices and gateways only. It consists of both kernels and device middleware to ensure connectivity and interoperability. For gateway usage, it should also support sensor hub features for sensor integration. Eighty percent of IoT decision makers in the telco space cite connectivity support by IoT device OS as the most important feature to achieve transformation from M2M to IoT.
- › **Connectivity on an IoT management platform.** An IoT management platform runs within the data center of enterprises, either on-premises or in the cloud. It should support diversified connectivity across three areas: 1) wireless networks, such as Wi-Fi, 3G, 4G, and LTE; 2) short-range wireless networks, such as Bluetooth, ZigBee, Z-Wave, Thread, and 6LoWPAN; and 3) industry-specific interfaces, such as CANbus, Mbus, Profibus, OPC, and TR-069. The cloud integration capability is also key to ensure interoperability in the cloud, such as interfaces with public cloud, hosted private cloud, or private cloud. Most telco companies (67% to 77%) consider that these connectivity features of a management platform are important priorities to build up.
- › **Connectivity on an IoT network.** An IoT network is a key element to complete application scenarios in the telco space. In the licensed mobile spectrum, GSMA and 3GPP mainly support NB-IoT, LTE-MTC (eMTC), and EC-GSM-IoT (EC-GSM). Infrastructure pipelines of telco players must support these protocols, especially NB-IoT and eMTC. NB-IoT is one key LPWA technology, which requires less bandwidth and boasts longer battery life and good performance, while eMTC over a 4G network has a data uplink and downlink rate that is suitable for data-intensive IoT applications. Sixty-four percent of telco players cite connectivity support on a telco network to be an important priority on their agenda.



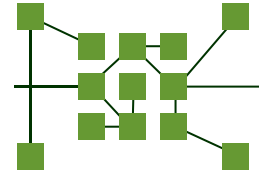
The connectivity layer ensures adaptive connections among devices and networks.

THE SECURITY LAYER PROVIDES END-TO-END PROTECTION FROM DEVICES TO APPLICATIONS

Given that most IoT devices run on embedded operating systems and utilize open source components, these devices are rapidly increasing your attack surface.⁴ As a result, a comprehensive security framework in cooperation with platform, network, and terminal devices has become essential to ensure customer trust and reliable business operations. This layer mainly addresses two key challenges: 1) security is a key requirement in IoT adoption, which varies in different verticals and scenarios; therefore, established security capability can help address contextual challenges regarding customer and industry knowhow; and 2) end-to-end security is another technical difficulty in IoT architecture; therefore, it's also one key differentiator of your IoT platform.

The key elements of this layer mainly consist of two categories — security support by IoT device OS and security features provided by management platforms (see Figure 9).

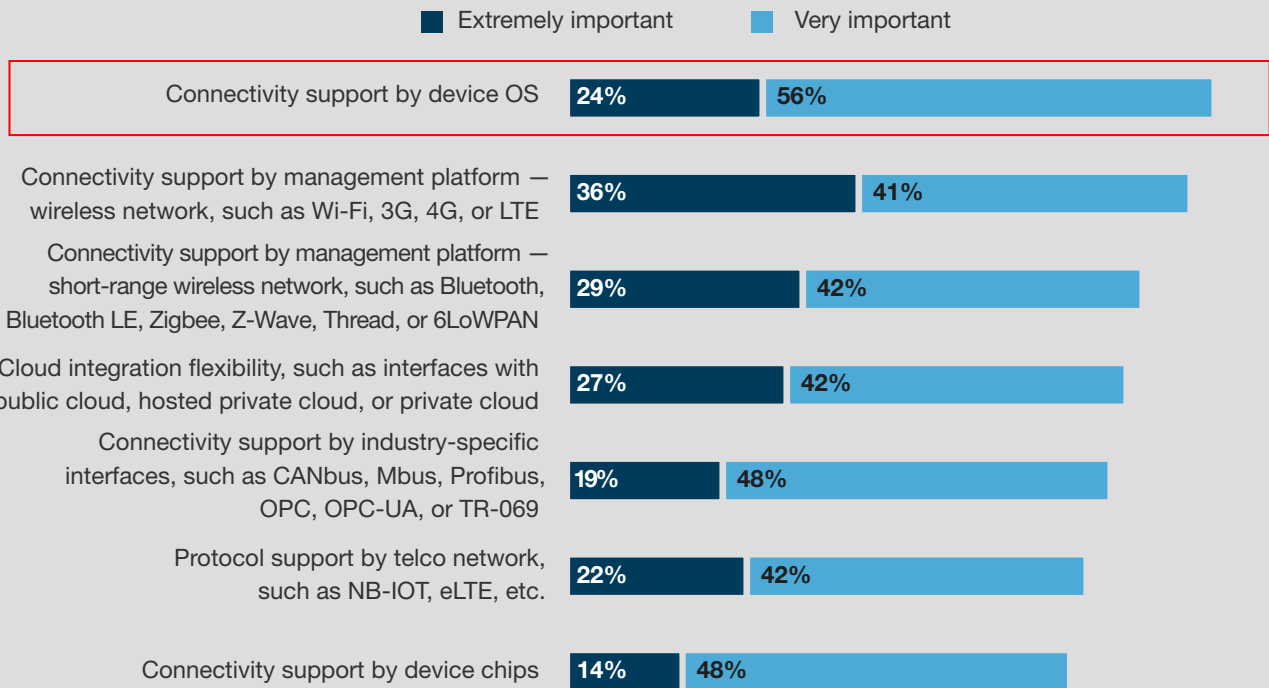
- › **Security support by an IoT device OS.** An IoT device OS provides light and scalable kernels, libraries, and middleware to enable device applications for IoT requirements. The security support on each area of OS software — from runtime execution environment, data encryption, identification check, and intrusion detection to connectivity management and remote security management — sets the foundation of endpoint security on the device side. Eighty percent of IoT decision makers in telco companies flag security by IoT device OS as key to transformation from M2M to IoT.
- › **Security support by an IoT management platform.** IoT management platform should not only provide access control and strategy management based on user and role. It should also allow device-centric identification and access management, including the “black and white list” function that can protect against network attacks from spiteful terminal devices and the “wave breaker” function for the massive and high-density wireless IoT deployments. In addition, data encryption and data isolation on the platform is also a key element for platform security. The percentage of telco companies that prioritize these security features on management platforms ranges from 61% to 74%.



The security layer provides end-to-end protection from devices to applications.

Figure 8

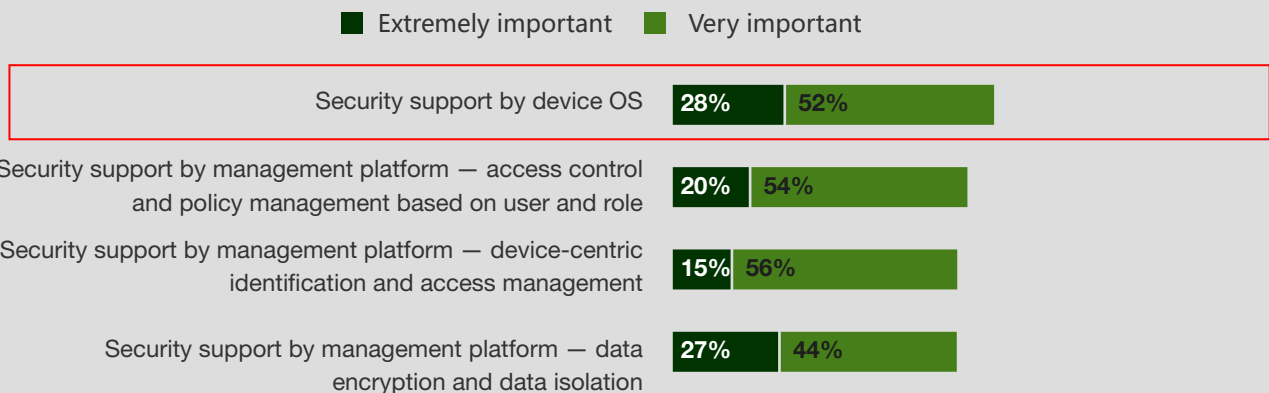
“Please rate, on a scale of 1 to 5, the importance of the following statements on the transformation from M2M to IoT.”



Base: 203 IoT decision makers in China, Japan, Korea, and Europe
Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Figure 9

“Please rate, on a scale of 1 to 5, the importance of the following statements on the transformation from M2M to IoT.”



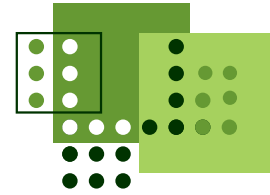
Base: 203 IoT decision makers in China, Japan, Korea, and Europe
Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

THE MANAGEMENT LAYER SIMPLIFIES DIGITAL OPERATIONS AROUND IOT SERVICES

This layer has comprehensive management features that help telco players address three key challenges of business development and long-term competitiveness: 1) the configurable business orchestration and rule engine within software and application platforms accelerate application delivery, meeting the challenge of insufficient application delivery capabilities toward business development; 2) the enablement of multiple business models provided by subscriber identity module (SIM) card management, billing management, and subscription management are the actual challenges that telco players and their partners will be facing during the collaborative innovation process; and 3) the effective operations management of IoT assets is a difficulty from both the technology and management perspectives; therefore, the successful realization of an IoT management layer will differentiate your IoT platform from competitors.

The key elements of this layer mainly include four capability elements: operational processes integration and visualization, device management, business orchestration and rule engine, and support for multiple business models (see Figure 10).

- › **Unified operational processes integration and visualization.** First, the management layer must provide monitoring, alerting, and operational calls that support various alerting mechanisms through different channels, such as device-level alerts activation through SMS, email, or social platforms, as well as invocation of operational processes and asset life cycle management functions. Second, operational dashboards and other visualization features will help operations teams implement the operation of IoT business and identify bottlenecks to ensure business continuity. Eighty-two percent and 73% of interviewed companies consider these two capabilities respectively important for their transformation.
- › **Intuitive device management.** The IoT device management component manages IoT equipment remotely, including configuration, monitoring, and security. Intuitive solutions with ease of use will help IoT operations teams accelerate business innovation by working with business stakeholders. Therefore, 73% of IoT decision makers cite it as a key to transform from M2M to IoT.



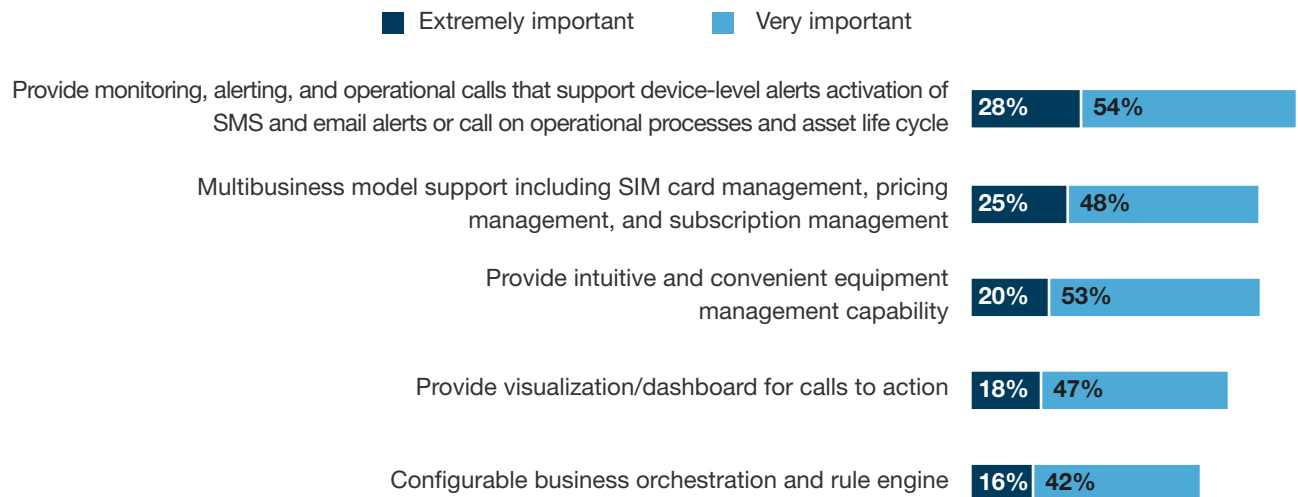
The management layer simplifies digital operations around IoT services.

- › **Diversified business model support.** SIM card management, pricing management, and subscription management are the three key areas to power telco business in the IoT space. These features should be seamlessly integrated with related back-end systems with necessary reliability, consistency, security, and governance. Seventy-three percent of telco players flag it as an important capability for them to build up.
- › **Configurable business orchestration and rule engine.** To allow maximum business agility to respond to shifting user behaviors and changing operations environments, repositories of infrastructure assets and management artifacts must be established with fine-grained configurability and policy-based flexibility. Business rule engines will turn the management insights of business stakeholders and technical professionals into reusable business rules for easy customization and possible integration with business processes.

Fifty-eight percent of interviewed IoT decision makers prioritize it on their agenda.

Figure 10

“Please rate, on a scale of 1 to 5, the importance of the following statements on the transformation from M2M to IoT.”



Base: 203 IoT decision makers in China, Japan, Korea, and Europe

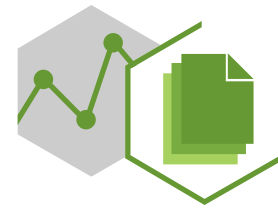
Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

THE COMPUTE AND ANALYTICS LAYER TRANSFORMS IOT DATA INTO INSIGHTS

This layer has rich infrastructure and analytics features, which can help companies in the telco space meet the challenges in all three dimensions: 1) from a network evolution perspective, its diversified infrastructure support together with analytics capabilities can effectively convert aggregated data into customer and business insights; 2) from a business development perspective, its cloud-native infrastructure support is the key to cloud-based integration and application delivery, and its analytical capabilities will help in ecosystem innovation; and 3) from a long-term competitiveness perspective, its comprehensive advanced analytics and hybrid-cloud management capabilities will set the critical foundation for business collaboration with partners in emerging areas, such as applications in blockchain and AI.

The key elements of this layer mainly cover four areas: analytics infrastructure, advanced analytics support, cloud-native infrastructure, and hybrid-cloud management (see Figure 11).

- › **Heterogeneous analytics infrastructure.** Analytics infrastructure is the foundation of data aggregation, persistence, and analysis. It should include support for both SQL and NoSQL databases, as well as distributed computing and analytics frameworks like Hadoop and Spark. Seventy-six percent of telco players cite it as key to their transformation, which is the highest among all capabilities within this layer.
- › **Comprehensive advanced analytics.** Advanced analytics capabilities span a wide range of technology segments, including predictive analytics and machine learning, blockchain-based analytics, social media data aggregation and analytics, and industry analysis templates. It requires data with high quality and in many cases in real time. And business knowledge in each vertical or segment will be essential for algorithm training and model optimization. Seventy-three percent of IoT decision makers consider it as a key to transform from M2M to IoT.
- › **Cloud-native infrastructure.** Container management and container-based PaaS solutions enable foundational elastic computing capabilities to execute IoT-specific workloads in the cloud. They normally have better performance than traditional VM-based solutions. And they are microservice-oriented and dynamically orchestrated, speeding up business composition and application delivery at the same time.⁵ Seventy-three percent of telco players flag it as an important capability for them to build up.
- › **Hybrid cloud management capabilities.** Hybrid cloud management capabilities ensure unified management of cloud-based infrastructure, middleware, and/or application platforms using any combination of public, private, hosted, and virtual private cloud deployment models, with integration coverage based on the technology landscape and digital business requirements of telco companies.⁶ The growth of hybrid cloud adoption makes it even more critical for technology management (TM) leaders to strategically build their hybrid cloud management capabilities, and 58% of interviewed IoT decision makers prioritize it on their agenda.

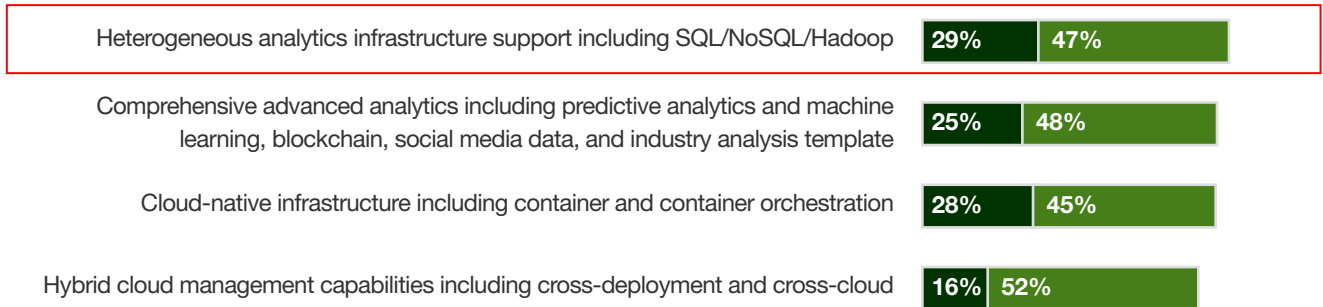


The compute and analytics layer transforms IoT data into insights.

Figure 11

“Please rate, on a scale of 1 to 5, the importance of the following statements on the transformation from M2M to IoT.”

■ Extremely important ■ Very important



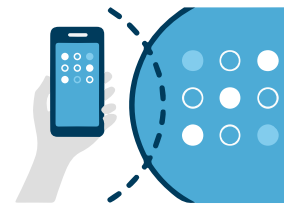
Base: 203 IoT decision makers in China, Japan, Korea, and Europe

Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

THE APPLICATION LAYER ENABLES FAST VERTICAL AND HORIZONTAL IOT INNOVATION

This layer aims to leverage the strategic benefits of technologies, methodologies, and best practices to help telco players achieve improvements in all three dimensions: 1) from a network evolution perspective, the effective support for multiple protocols on data layers can improve the breadth of protocol coverage; and 2 and 3) from business development and long-term competitiveness perspectives, its prebuilt application templates and DevOps capabilities can improve the speed of application delivery for their partners, which is also a key differentiator for their telco IoT solutions (see Figure 12).

- › **DevOps capability for fast business development.** Continuous delivery-oriented DevOps practices include rapid development and delivery capabilities across the whole application life cycle, such as continuous integration, canary release/blue-green deployments, image management, and application marketplace. Eighty percent of telco players consider it as a key to transform from M2M to IoT, which is the highest among all capabilities within this layer.

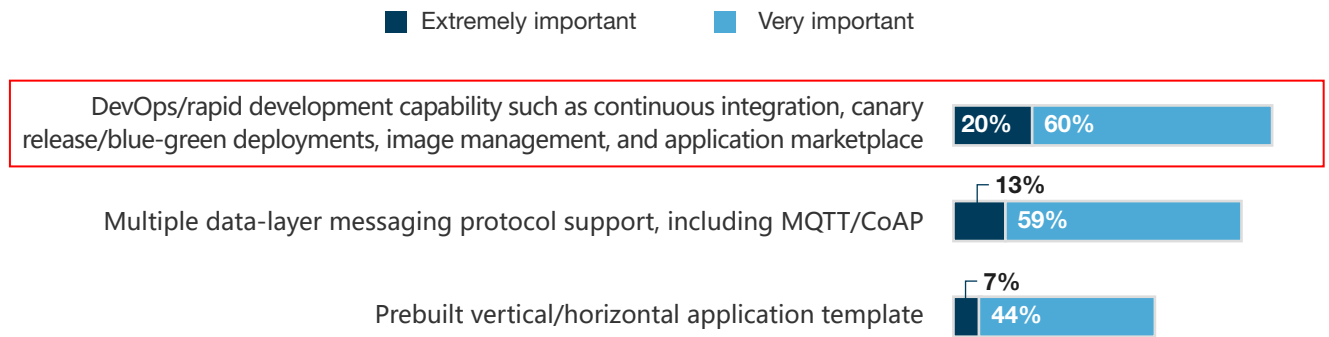


The application layer creates applications and integrates with enterprise systems. It enables fast vertical and horizontal IoT innovation.

- › **Multiple data-layer protocol support.** In addition to the transportation-layer protocols supported on the connectivity layer, other data-layer protocols must be effectively supported by the application layer to build composite IoT applications. Typical protocols include message queue telemetry transport (MQTT) as well as constrained application protocol (CoAP), which applies to different network topologies by design. CoAP is better for one-to-one communication to transfer state information between client and server, while MQTT is suitable for many-to-many communications to pass messages among clients via a central broker. Seventy-two percent of telco players prioritize this capability on their agenda.
- › **Prebuilt vertical and horizontal application templates.** All companies should avoid reinventing the wheel and focus on business innovation as much as possible. Application templates are based on different solutions specific to the application segment and/or vertical context. It's originated from the business knowhow and delivery best practices, aiming to accelerate application development and business innovation. Therefore, over half of interviewed telco players mark it as an important factor to accelerate their transformation from M2M to IoT.

Figure 12

“Please rate, on a scale of 1 to 5, the importance of the following statements on the transformation from M2M to IoT.”



Base: 203 IoT decision makers in China, Japan, Korea, and Europe

Source: A commissioned study conducted by Forrester Consulting on behalf of Huawei, July 2017

Key Recommendations

IoT is key to digital transformation, and enterprises in the telco space must put a cloud-native IoT software platform on their technology agenda, if not yet, to accelerate their digital transformation and boost their digital business. However, IoT is a data-driven, connectivity-based, and business-driven initiative. IoT initiatives are not short-term projects; they're part of a long-term journey that includes new ways of working and new introduction of technologies. Start with a business focus to determine the technologies you need; then select the right software to architect your IoT solutions. Don't underestimate the power of the digital ecosystem — it will help you dramatically improve competitiveness and ensure sustainable business growth.

Forrester's in-depth survey of 203 IoT decision makers about IoT yielded several important recommendations:



Technology decision makers and business leaders must collaborate to build a strong IoT business case. Without proper leadership support, IoT initiatives will not see the light of the day — and a strong IoT business case is the most effective way of securing such support. Which industries or functions have the most reliable IoT technologies? What standards and protocols apply to the business areas of interest? How difficult will it be to integrate IoT with existing systems? IoT decision makers in the telco space must answer these questions to make their IoT business case much more complete and to find the ideal quick wins that create tangible benefits for their organizations.



Take a systematic approach to choose the right IoT platform. For telco companies without a very experienced IoT team, commercial products and services might often be a better choice. To narrow down which IoT platform vendors to consider, start by identifying and collecting IoT use cases that your firm is pursuing. These use cases for telco players normally require solution and service providers to have proven products and experiences in both telco and IT spaces with geographical coverage in your regions. You should set up a comprehensive evaluation framework to find the IoT platforms that fit to your business context the best.

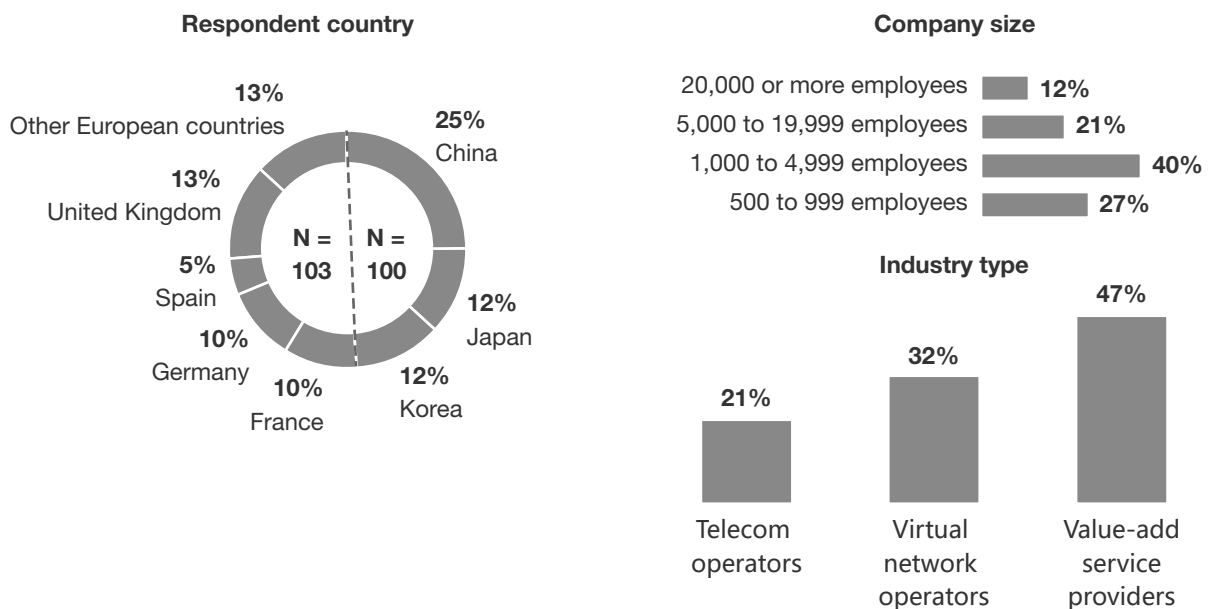


Focus on a long-term value ecosystem to achieve sustainable business growth. Data captured by connected products provides new opportunities to create value for various roles not only inside the organization, but also across the whole value ecosystem. You should plan for long-term scalability to make sure your infrastructure can scale to support hundreds of thousands of connected devices and is flexible enough to address unexpected spikes in device amount and data traffic. You should think about how to open up your capabilities and data in appropriate ways to enable multidirectional data sharing, so as to facilitate value cocreation with partners.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 203 telecom organizations in China, Japan, Korea, and Europe to evaluate key drivers and challenges of telco operators in their IoT transformation journey and what the key attributes are that they expect IoT platform partners to provide. Survey participants included decision makers who are responsible for digital transformation, new technology, network platforms, and IoT initiatives. Questions provided to the participants asked about their companies' current adoption of IoT and expectations, as well as their organizational challenges and priorities. The study began in June 2017 and was completed in July 2017.

Appendix B: Demographics/Data



Appendix C: Supplemental Material

“Vendor Landscape: Container Solutions For Cloud-Native Applications,” Forrester Research, Inc., January 30, 2017.

“Design Your EA Organization For Influence And Impact,” Forrester Research, Inc., November 17, 2016.

“Predictions 2017: Security And Skills Will Temper Growth Of IoT,” Forrester Research, Inc., November 2, 2016.

“Craft Your Digital Vision,” Forrester Research, Inc., February 9, 2016.

“Architect Hybrid Cloud Management To Boost Your Digital Business,” Forrester Research, Inc., August 25, 2015.

“Internet-Of-Things Software Platforms Simplify Transformation Of Business Operations,” Forrester Research, Inc., April 2, 2015.

“The Future Of Business Is Digital,” Forrester Research, Inc., March 20, 2014

Appendix D: Endnotes

ENDNOTES

- ¹ As your customers learn to embrace digital experiences and technologies as a normal part of their lives, their expectations constantly evolve. Source: “Craft Your Digital Vision,” Forrester Research, Inc., February 9, 2016.
- ² Digital transforms the game of business. Source: “The Future Of Business Is Digital,” Forrester Research, Inc., March 20, 2014.
- ³ IoT software platforms are emerging as an important new type of enterprise software. Source: “Internet-Of-Things Software Platforms Simplify Transformation Of Business Operations,” Forrester Research, Inc., April 2, 2015.
- ⁴ The fact that many IoT solutions lack simple update and patching mechanisms exacerbates the problem, making remediation of security vulnerabilities more challenging. Source: “Predictions 2017: Security And Skills Will Temper Growth Of IoT,” Forrester Research, Inc., November 2, 2016.
- ⁵ Container technologies allow enterprises to create highly differentiated apps and services faster, with better quality and geographic reach, to create compelling customer experiences. Source: “Vendor Landscape: Container Solutions For Cloud-Native Applications,” Forrester Research, Inc., January 30, 2017.
- ⁶ Hybrid cloud must be your strategic priority for digital business. Source: “Architect Hybrid Cloud Management To Boost Your Digital Business,” Forrester Research, Inc., August 25, 2015.