A PERSPECTIVE ON THE INTERNET OF THINGS

AN **FTI CONSULTING REPORT**

EXPERTS WITH IMPACT™

EVOLUTION OF THE IOT VALUE CHAIN

The Internet of Things (IoT) is widely regarded as the next industrial revolution, combining hardware with software, connectivity and data to create new levels of value for customers. Management guru Michael Porter believes IoT is the "Third Wave of IT-Driven Competition" unleashing "another leap in productivity."[1] According to a survey conducted by Verizon, 73% of executives are either researching or currently deploying IoT solutions.[2]

Over the past couple of years there has been a lot of buzz around IoT. The M&A values and volumes indicate that the hype cycle is over and companies now see IoT as a mainstream commercial value creator for the future. The lines between traditional technology companies and non-tech players are fading as new business models emerge.

The evolution of technologies such as cloud and big data create multiple opportunities to develop new revenue streams. Companies are looking to expand across the stack (Figure 1) using M&A, and the competition for IoT M&A targets has intensified, with traditional tech companies and Original Equipment Manufacturers (OEMs) bidding for targets driving valuations high. During H1 2018, M&A valuations for IoT related transactions were among the highest (~ 5.3x revenue).[3]

The IoT stack is getting crowded with a number of established and emerging companies playing across the spectrum, ranging from embedding chips into manufactured products, creating firmware, platforms, connectivity, analytics and services, while also finding niche vertical and horizontal plays. It is widely believed that value realization will be higher with business models playing higher up the stack.
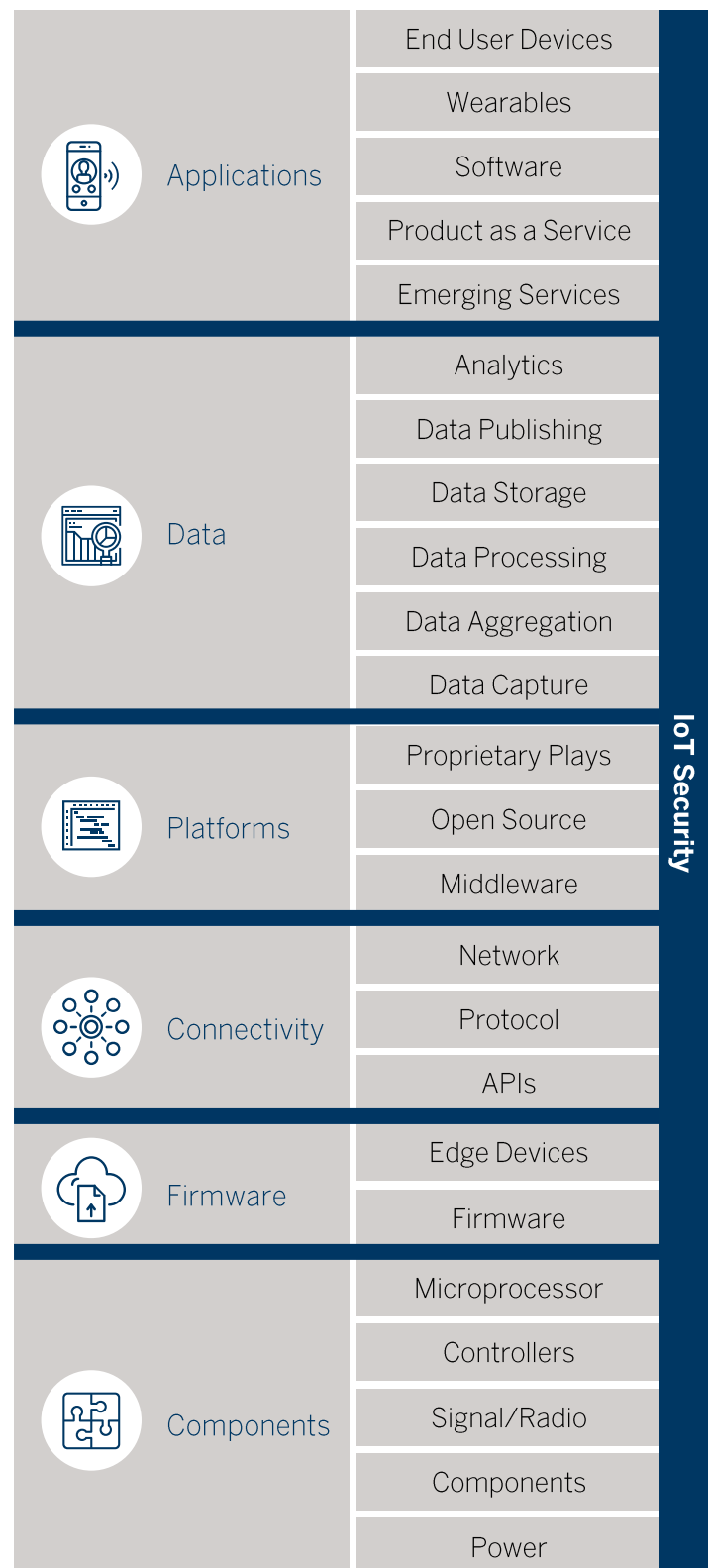
Applications	End User Devices	
	Wearables	
	Software	
	Product as a Service	
	Emerging Services	
Data	Analytics	
	Data Publishing	
	Data Storage	
	Data Processing	
	Data Aggregation	
	Data Capture	
Platforms	Proprietary Plays	
	Open Source	
	Middleware	
Connectivity	Network	
	Protocol	
	APIs	
Firmware	Edge Devices	
	Firmware	
Components	Microprocessor	
	Controllers	
	Signal/Radio	
	Components	
	Power	

IoT Security

Figure 1 – IoT value chain across the stack

THE CHALLENGE WITH IOT STRATEGY

INDUSTRIAL COMPANIES MOVING UP THE STACK

Capabilities Needed: device interface/ management, data processing/ management, analytics, security, application enablement, enterprise integration, business process intelligence and simulation. (e.g. GE acquired Wurldtech Security Technology)

TECH COMPANIES EXPANDING UP & DOWN THE STACK

Capabilities Needed: analytics/ data, device interface management, product design, contract manufacturing and interconnectivity APIs to the cloud

CONSUMER & INDUSTRIAL IOT ARE EVOLVING DIFFERENTLY

Capabilities Needed: will vary between consumer IoT driven by delivering experiences and self improvement use cases. Industrial IoT will be driven by lowering costs, improved efficiency and developing data enabled foresights.

IoT Continuum

Figure 2 – The IoT Capability Continuum is Still Evolving

Most of that value created by IoT today is data used to improve operating efficiencies. Using IoT to generate incremental revenue with customers is less mature. OEMs are starting to collect data from their installed base and the first pilot projects are starting to demonstrate value. However, companies are struggling to determine how to monetize their IoT offerings. Most equipment OEMs FTI Consulting is working with generate less than 5% of their revenue from IoT related services, and many less than 1%. A survey conducted by FTI Consulting's Technology M&A Practice across 12 industries highlighted that 30% of respondents have not captured any value from their IoT efforts.

Why don't companies achieve more value from their IoT investments? Blinded by the promise of a new industrial revolution and unprecedented revenue growth, many companies jump onto the IoT bandwagon unprepared. Solutions are provided to customers free of charge to subsidize product sales. The IoT solutions are brought to market using legacy go-to-market approaches, sub-optimizing sales potential. Development organizations remain in their legacy locations, unable to attract the necessary talent.

Developing and executing an IoT strategy is different from a traditional product or service strategy. On the following page, we have outlined three differences in strategy definition, and three differences in strategy execution.

IOT MARKET DYNAMICS

New business models are emerging where companies are trying to subsidize or fund hardware with subscriptions, services, advertisements and software. Across IoT ecosystems, platform strategies have dominated product centric strategies. IoT platforms are able to externalize value creation which exponentially increases platform value as the user base grows.

Traditional technology companies like Google, Apple and Amazon continue to add hardware products to their software and internet stack whereas traditional manufacturers and OEMs are adding technology to the core capability hardware products.

Security concerns continue to inhibit greater adoption of IoT solutions. Gartner found that approximately 20% of organization have observed one IoT-based attack at least in the past three years. Gartner predicts spending on IoT security to double over the next three years.[4] Multiple connectivity standards such as Z-Wave, Bluetooth LE and ZigBee further complicate strategic choices.

DEVELOPING THE IOT STRATEGY

IoT tends to unlock insights and create value from multiple data streams during the normal course of business. Developing a strategy requires integration of insights between products, customer segments, channels and back end systems and processes.

MARKET FOCUS

There is a difference in the way the market is defined: traditional strategies segment the market around similarities in buying behavior with an objective to develop products/services and go-to-market approaches tailored to each segment to maximize revenue. In the IoT world, companies are selling their ability to unlock data, insights and intelligence through a combination of data streams generated during normal course of business. Attractive segments in an IoT strategy are those where OEMs can create the most value from data collected. Large customers might no longer be the most attractive segment as they may have developed internal capabilities at scale to collect and analyze their own sensor data.

NON-TRADITIONAL COMPETITION

Many companies are realizing that IoT is bringing non-traditional competitors into the market. Companies with advanced analytics capabilities can now enter and provide services to your IoT customers, as the OEM is no longer an advantage taken for granted. Competitive position is shifting from products and attributes to the value-creation point on the technology stack. Some good examples are smart grids and connected cars. Apple and Google are developing software for smart grid, smart home controls and platforms for car dashboards. Our recent IoT survey revealed the data and analytics layer being considered the most effective for value creation, with the least value being perceived at the component layer.

PRODUCT FOCUS

Some companies apply IoT to their own products while others can monetize products from ecosystems. For example, GE offers predictive maintenance (traditionally offered on its own engines) on other people's products using the Predix platform. Evolution of additional capabilities such as modeling, monitoring and incorporating human behavior into IoT will further enhance value with multiple applications for each IoT offering cutting across consumer and industrial IoT. Using IoT technology for improving energy efficiency in "smart buildings" can be transferred to other applications like human energy efficiency by partnering with sports watch manufacturers to analyze collected data to improve work out efficiency.
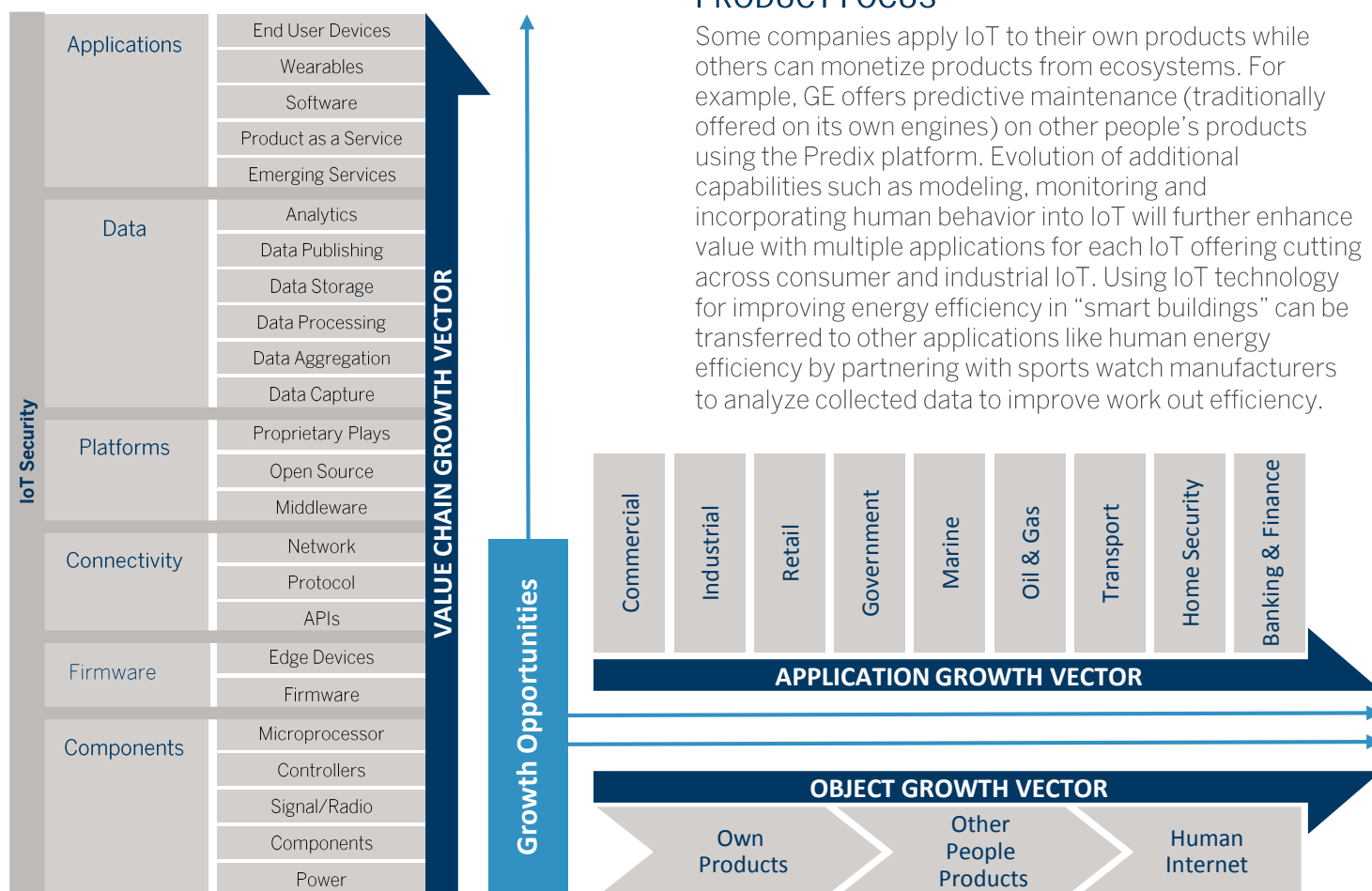

Figure 3 – Possible growth vectors for IoT

IOT BUSINESS MODELS

Business Models	Key Characteristics	Industry Examples
Platform Strategy	Co-developed with users with shared benefits. Value scales exponentially with size of user base.	*Connected Home (e.g. Amazon Alexa)*
Subscription Services/ Sales	Value is directly proportional to the number of active and paying users, similar to traditional business models	*Hue* *Vrad* *Nest*
Product as a Service	Initial investment to create early install base, value created as service revenue breaks even with initial investment. Data is used to track product and usage patterns.	*Rideshare* *Power by the hour*
Digital Add-on	Value increases as more users activate digital services	*Apps e.g., smart watch*
Customer Loyalty and Switching Cost	Digital services provided free to improve customer experience with product and competitive positioning. Value created through increased loyalty, customer experience and switching costs	*Incheon Airport* *Caterpillar*

Figure 4 – Business Model Characteristics

The fundamental question for an IoT strategy is which business model should be picked to make money. Five distinct business models and their variants are starting to evolve on the IoT stage.

Many companies start with giving away IoT services to differentiate their products and facilitate hardware sales. This makes sense, but does not provide a sustainable competitive advantage. Good examples are Caterpillar and John Deere providing value added analytics on their equipment to help enhance the value their customers receive from using the product and differentiate themselves in the market. We recommend companies either skip this step or move through it quickly.

Another business model is the 'digital add on.' The value increases as users opt to activate new services. This is much like the apps we are all used to on our mobile devices, when initial value is provided for free to establish an installed base quickly. A proven way to rapidly establish an installed base is the Product-as-a-Service model. Our recent IoT survey indicated this model as the most popular in use today, and projects more growth in the days to come. Initial investment in the hardware equipped with sensors and IoT services is recovered over time by usage of hardware being paid through fees. This 'pay per use' model

has been used in the form of 'power by the hour' in the airline industry for a few decades. A similar model is the Subscription Based Service. Nest and Hue are two good examples of this business model. The value of the offering increases linearly with the number of users, either through charging for the hardware as a traditional product sale ,or as part of a monthly subscription fee.

New and emerging business models have predicted exponential growth. Cisco estimates about 50 billion devices by 2020 and Gartner predicts creation of $1.9 Trillion in economic value attributed to IoT.

Finally, the most attractive business model for growth is Platform Strategy. The value to the company is exponential to the number of users of the IoT offering. An example of this is predictive maintenance analytics: as more users sign up, more equipment data is collected and the value of the prediction goes up. Even though the value of this model is significant and intuitive, achieving this value is not without challenges. The biggest challenge is agreeing on data ownership and building enough users to reach the inflection point (e.g. no one wants to buy the first fax machine).

IOT BUSINESS MODELS (CONTINUED)

Choice of the business model and position on the stack will inform the execution strategy for IoT players. Organizations can also adopt one or more business models in parallel depending on the products, solutions, data and ecosystems that they have access to. Business models will need to have enough flexibility to evolve as technology, partnerships and players mature – ideally we recommend testing and prototyping specific business model centric use cases before scaling them with large capital investments.

PLATFORM STRATEGY
- Value of network is proportional to square root of users
- Example: predictive maintenance analytics
- Requires co-development with customer and sharing of benefits

PRODUCT SALES / SUBSCRIPTION SERVICE
- Value increases linearly with number of customers
- Example: Nest, Hue, vRad
- Most similar to traditional business models

PRODUCT AS A SERVICE
- Initial investment to establish installed base
- Value created as service revenue starts to reach break-even on initial investment
- Example: rideshare, power by the hour
- Data is used to track user and product behavior

DIGITAL ADD-ON
- Value increases as users activate new digital services
- Example: Apps (e.g. Smart Watch)

CUSTOMER LOYALTY AND SWITCHING COST
- Digital services provided for free to enhance customer experience with product or to improve competitive positioning
- Value created through improved customer experience and brand loyalty
- Also provided opportunity to increase switching cost
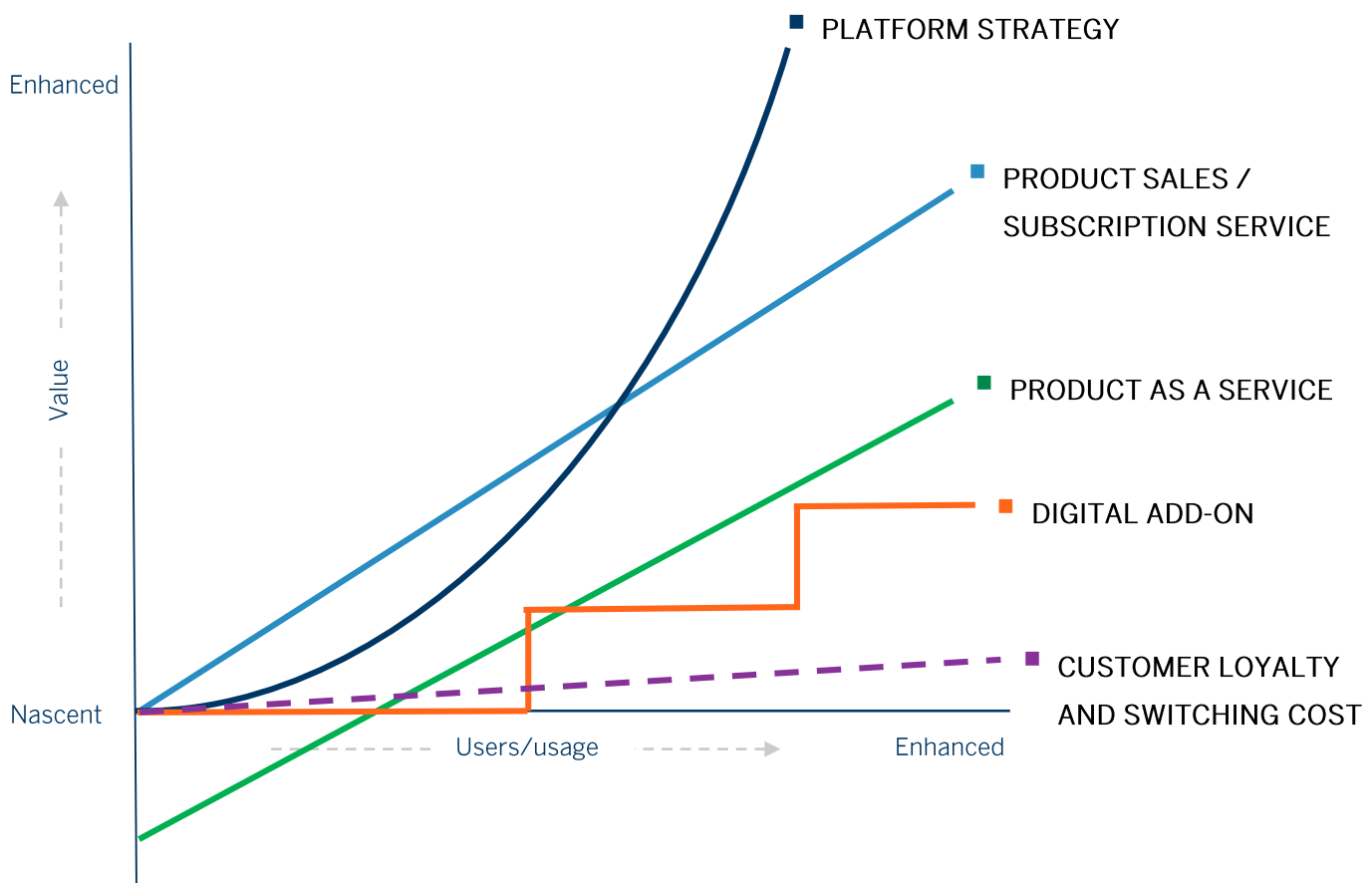- Example: Caterpillar, Incheon Airport

Figure 5 – IoT centric business models

EXECUTING THE IOT STRATEGY

As Morris Chang, Chairman of Taiwan Semiconductor Manufacturing Company, said: "Without strategy, execution is aimless. Without execution, strategy is useless." We have identified three areas where execution of an IoT strategy is different from a traditional product strategy.

GO-TO-MARKET

Delivering revenue from IoT requires a coherent and tight coupling between sales, marketing, products, pricing, customer experience and various cross functional areas. To begin with, the sales force needs to be retrained in selling outcomes and understand how IoT applications create value in their customer's processes. Pricing will be based on the value created with the IoT solution and will vary by customer. The sales force will need to transition from selling high capital intensive products to senior executives, to selling to multiple economic buyers within their accounts where benefits will typically accrue. They will also have to learn to leverage analytics and big data to gain insights into customers' decision making, usage and customer experience.

ORGANIZATION AND TALENT

Developing IoT skills requires a different set of skills applied towards developing new capabilities, and many companies (GE, Samsung, Airbus etc.) have set up High Tech centers in talent hubs such as Silicon Valley and Boston to attract the right talent. Solutions are never created in a laboratory, but with customers through a very iterative process. This phenomenon is illustrated by reviewing the posted job descriptions of early IoT solution providers like Taleris (airline predictive maintenance) – job description included IT integration Services, Data Technologists and "support our clients in interpreting data analysis outcomes and enabling them to make actionable maintenance decisions." Value is created in continued use of the solution, embedded in the customer's processes.

ECOSYSTEMS AND PARTNERSHIPS

IoT products and solutions are brought to market by an ecosystem of partners with intertwined (or independent) business models, bringing their own value proposition to the ecosystem. Speed to market is more important than vertical integration and as a result, partnerships span different areas of the IoT stack. For example, in the Oil & Gas space, Schneider and Cisco are partnering on the "smart pipeline" offering.

Another critical factor powering partnerships would the overall "stack strategy." Many companies are acquiring capabilities towards being a full stack player; others are creating bespoke stacks through integration with custom solutions. Both OEMs and Technology companies are faced with a strategic decision around acquiring a full stack or assembling a custom stack through partnerships. Full stacks are self-contained ecosystems with use cases such as supply chains, flow optimization etc. Full stack capabilities include business logic, hardware, software, data, operating systems, storage, connectivity (cloud to cloud and product to cloud), security and other enterprise capabilities required to deliver full solutions and early adoption. Apple is a good example of a full stack.

Bespoke stack adopters believe in being vendor independent and not being locked in like some of the legacy software vendors like Microsoft and SAP once did. The objective is to keep all the pieces separate yet leaving room for integration based on solution and customer needs promising more flexibility and agility over complex full stacks. Stack choices have implications on the business model with pros and cons, it is likely that certain verticals and solutions will gravitate towards stacks being configured in a certain way and adding aligned capabilities. A dominant player has not yet emerged yet – both business models, stack strategies are still evolving.

IN CONCLUSION

Like any other business transformation, IoT is a change process. Companies should hit the "pause" button, think about where they want to play in the IoT space and where in the technology stack and the eco-system they can provide most value. Then they can adapt their operating model for success – aligning sales, pricing, product development, and delivery organization, processes, and incentives to the new strategy.

IoT is a journey starting with engaging internal stakeholders and customers. It is a cultural shift for many organizations towards a very different approach to creating value for customers and shareholders. Strong executive support backed by thorough analysis, a fully functional change management program and disciplined execution will be key to unlocking value from the next generation IoT business model.

References

1. "How smart, connected products are transforming competition." Michael Porter and James Heppelmann. Harvard Business Review, 2014
2. "State of the Market: Internet of Things 2017," Verizon, 2017.
3. "Software M&A Overview," Ernst and Young, 2018.
4. "Forecast: IoT Security, Worldwide, 2018." Gartner, March 2018.

Note: Figures 1-5 are FTI Consulting Illustrations

About FTI Consulting IoT Practice

IoT executives do not need to face today's challenges alone. FTI Consulting is a leading advisor to companies across the Technology and Industrial Products sectors. Our experts provide guidance to companies, their executives, equity holders and/or creditors throughout all stages of a company's life cycle. We provide strategic, financial and operational advice with hands-on implementation for business model innovation and transformation, mergers acquisitions, divestitures, due diligence, integration and separation as relates to the IoT initiatives within our clients.

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