

Lead or lag?

What the Industrial Internet of Things means for deals

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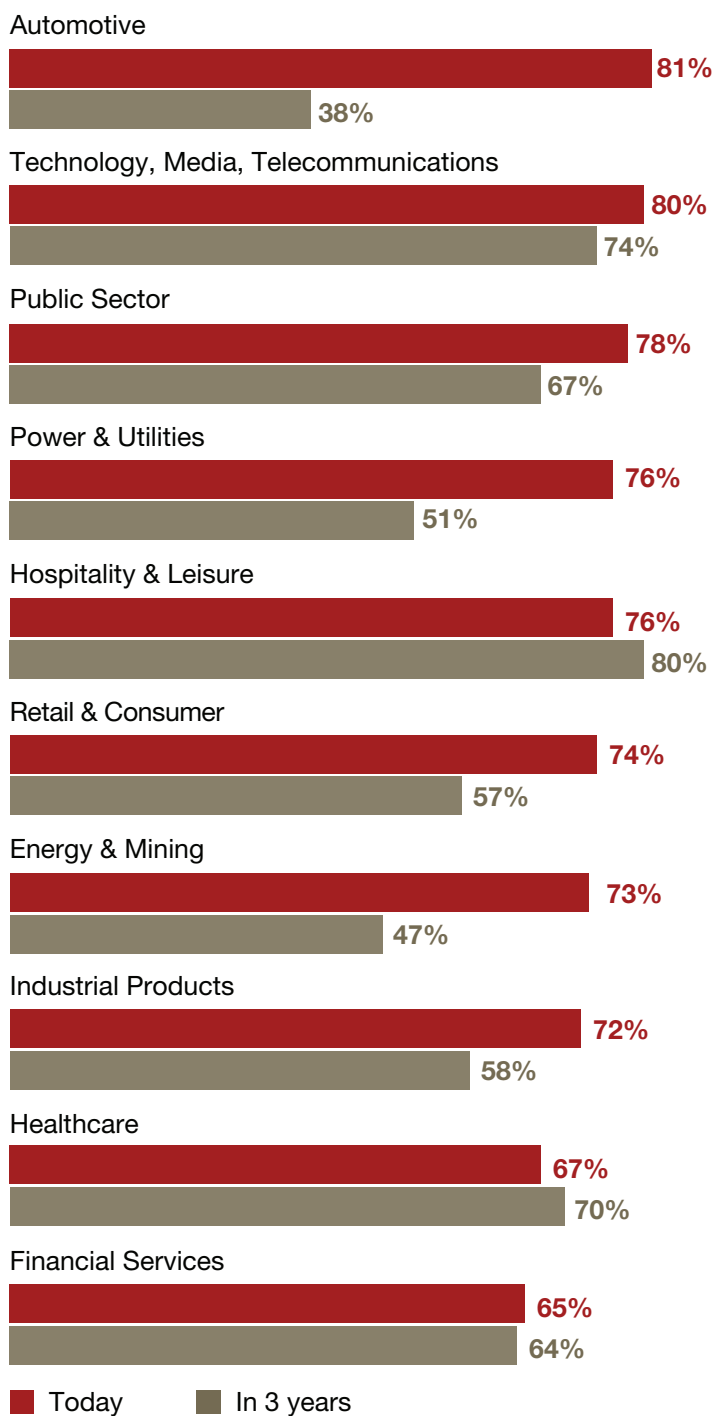
The internet of things (IoT) has conjured countless predictions. By 2020, almost 21 billion-plus devices with built-in sensors will be connected to the internet.¹ According to PwC's 2017 Global Digital IQ Survey, 73% of executive respondents currently have IoT initiatives underway.² Such forecasts are igniting rapid transformation across business. That, in turn, means new paths for both private equity and business investments. And investors who follow the right paths will become the leaders in this emerging world.

The IoT's potential to create new and innovative consumer retail experiences has attracted a lot of attention. But here we focus on what it means for industry and manufacturing.

The *industrial* internet of things (IIoT) has the potential to dramatically boost productivity and cut costs across manufacturing, transportation, logistics and energy. It could also spur new business models. By building sensors and networking devices into their equipment, vehicles and facilities, industrial companies can manage their performance like never before. And they can use the resulting data to predict their maintenance needs and sharpen their operations.³

IoT investment by industry

Which technologies are you making substantial investments in?



Source: PwC, 2017 Global Digital IQ® Survey
 Bases: Automotive: 72; Energy & Mining: 135; Financial Services: 322;
 Healthcare: 237; Hospitality & Leisure: 75; Industrial Products: 375;
 Power & Utilities: 131; Public Sector: 156; Retail & Consumer: 217;
 Technology, Media & Telecommunications: 433

¹ Gartner, "Gartner Says 8.4 Billion Connected "Things" Will Be in Use in 2017, Up 31 Percent from 2016," February 7, 2017

² PwC, 2017 Global Digital IQ Survey, 2017

³ PwC, Q&A: The internet of things, 2017

Investment grows—and so do deals

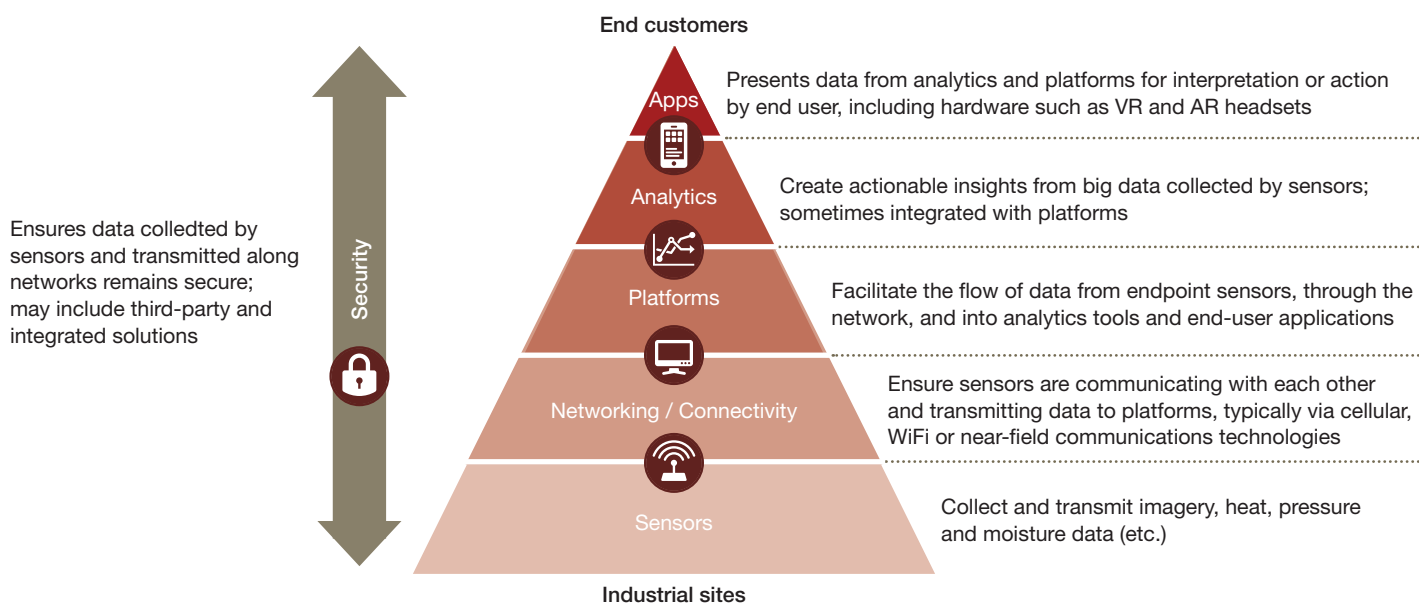
Not surprisingly, investing in IIoT capabilities and solutions is becoming a growing priority for leading industrial and technology players. They're looking to enhance their capabilities through embedded sensor technologies that collect new streams of operational data, and they want to use advanced analytics and machine learning to get maximum value from that data. IIoT spending across the manufacturing, transportation and utilities sectors alone reached an estimated \$325 billion in 2016. It's expected to grow to nearly \$600 billion by 2020⁴.

Mergers and acquisitions (M&A) will be central to industrial and technology firms' strategies as they try to tap into the opportunities the IIoT creates. Many leading analytical applications and platforms are being developed by software startups or small technology firms, which can be attractive acquisition targets. Industrial IoT saw its 4th straight year of growth in 2016, with investment totaling over \$2.2B across 321 deals. That translates to a 21% boom in deals and a 5% increase in funding.⁵ IIoT has also sparked significant consolidation among larger, more established players in sub-sectors like semiconductors and sensor design.

Perhaps most importantly, the advent of the IIoT has also created opportunities to develop innovative, service-based business models. Here we highlight the key IIoT deals trends, themes and lessons. And we look at the technologies and solutions that represent the most promising opportunities for private equity investors and firms seeking new sources of value in the IIoT.

Understanding the IIoT ecosystem

The industrial internet of things populates a multi-layered ecosystem that has closely interacting components. Many companies offer IIoT solutions that span these layers.



Source: PwC research and analysis

⁴ IDC, *Internet of Things Spending Forecast to Grow 17.9% in 2016 Led by Manufacturing, Transportation, and Utilities Investments, According to New IDC Spending Guide*, January 2017

⁵ CB Insights, *Industrial IoT Hits another Annual High in Deals and Dollars*, March 2017

Big beasts buy in—and join forces

The large firms making the greatest strides in the IIoT have tended to come at it from opposite but converging directions. Industrial leaders are increasingly investing in sensors and analytic software technologies. Meanwhile, networking and connectivity giants are expanding their ability to collect, store and process data generated at the “edge” of conventional networks. That could be by oil rigs, city buses or rail cars.

Now, these firms are linking their IIoT efforts. Consider the partners in BitStew, an analytics provider for utilities, energy and manufacturing businesses. After leading a previous investment with Cisco a year earlier, GE acquired BitStew in late 2016 for \$153 million.⁶ That followed GE and Cisco’s earlier collaboration on integrating data from Cisco’s networking hardware into GE’s Predix IIoT platform.⁷

It’s still relatively early days for IIoT, and while there’s a lot of potential, the technical challenges are considerable. So we shouldn’t be surprised that the largest IIoT players are collaborating. As well as developing the underlying infrastructure of the IIoT, these large firms have become an important source of capital for small, IIoT-focused innovators and their investors. And their demand for new sensing, networking and analytics technologies will only grow.



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⁶ Green Tech Media, *BitStew Raises \$17M to Expand Data-to-Insight for the Smart Grid*, May 2015

⁷ GE Press Release, *GE and Cisco collaborate to accelerate manufacturing productivity*, September 2015

Would-be leaders innovate through acquisition

As the BitStew example suggests, aspiring IIoT leaders seem to be using acquisitions instead of traditional R+D to develop new IIoT solutions. Along with firms like Intel and Qualcomm, Cisco and GE have venture capital arms helping to build a pipeline of promising IIoT assets.

It's not only the industrial and software giants that are sinking capital into early-stage IIoT targets. Even companies in sectors such as construction and mining are starting to make these investments.

Emerging IIoT leaders investing in early and growth-stage ventures can create opportunities for private equity

and venture capital firms. These industrialist venture investors likely are interested in more than just acquiring new capabilities. As large internet and software firms have often shown, acquisitions aren't just a quick way to get the most innovative technologies. They can also offer rapid access to the most talented developers.

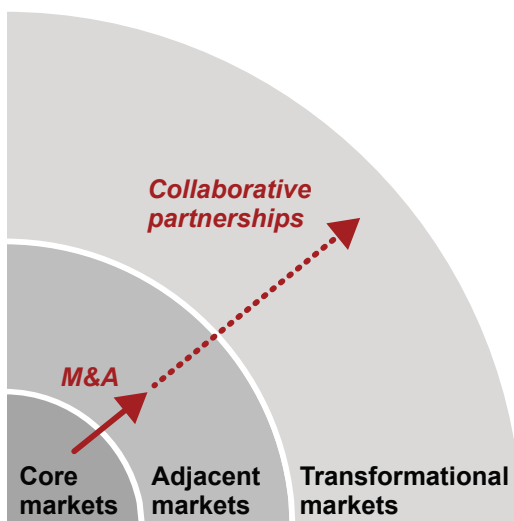
Companies invest in new business models

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space too. Leading firms aren't just enhancing their capabilities, but often transforming their business models.

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Illustrative corporate: Industrial automation powerhouse

- 1 Acquire assets in adjacent IIoT technology stacks to augment core offerings, creating an integrated platform**
 - Acquire routing software and satellite communications provider to strengthen connectivity offering
 - Acquire clouds software platform to management workflow analytics and solutions
- 2 Pursue collaborative partnerships in transformational markets to capture otherwise inaccessible revenue streams**
 - Partner with a flow control company to leverage strengths of leading domain experts in niche areas

Lessons emerge for private equity

It isn't just other aspiring IIoT leaders who can learn something from these ongoing transformations. Private Equity (PE) investors should take note, too. As the "as-a-service model" grows across different industrial verticals, new opportunities open for PE firms. It's their cue to assess which companies in their portfolios would benefit from integrating sensors and connectivity hardware into their products. An industrial air filter company, for

example, could monitor deteriorating filters and replace them pre-emptively for clients as part of a subscription service.

There's also growing enthusiasm—and an opportunity for investors—around developing integrated platforms that can help clients collect, analyze and store data, plus manage device connectivity. But there's also potential for smaller players to differentiate

and win market share based on the quality and sophistication of their analytics and how well they tailor their offer to industry verticals. The question is if customers prefer an "ecosystem" of different leading IIoT capabilities—which needs a high degree of interoperability across sensors and applications—or one complete platform? Time will tell.



Sensors and security top the PE to-do list

Early IIoT leaders might be enthusiastic about investing in early-stage, venture-backed companies that are innovating in analytics. But there's clearly potential for PE investors to cultivate growth-stage enterprises and there are priority IIoT investment areas for PE firms to focus on.

Sensor designers and manufacturers, for instance, will remain viable investment targets. They're typically more mature than software analytics firms and may offer more opportunities to grow through operational efficiencies. Consider UK-based chip designer ARM's \$350 million acquisition of imaging technology firm Apical last year.⁸ Then came the unexpected \$32 billion acquisition of ARM itself by Japanese internet and telecoms conglomerate SoftBank, in a reported shift toward investment in the IoT.⁹

Cybersecurity is also becoming a pressing IIoT investment priority. Harman International, a connected car product designer, acquired automotive cyber security provider TowerSec in January 2016¹⁰, a sign of how niche IIoT assets can be in today's market. Now may be the time for sponsors to bring cybersecurity assets to market, particularly ones with solutions for distributed networks of mobile devices.

Private equity brings innovation to portfolios

Private equity firms are identifying opportunities to upgrade conventional portfolio companies with IIoT-relevant capabilities, as well as explore service- and outcome-based business models

Illustrative asset: Industrial air filter manufacturer

- 1 Partner with hardware provider to equip filters with sensors and network connectivity devices
 - Capture filter lifecycle/usage data
 - Capture air quality data
- 2 Introduce outcome-based business model
 - "Filters-as-a-service" with subscription-based automatic replacements, per usage data
 - Explore upstream data-sharing arrangement with HVAC manufacturers or building energy management system providers
- 3 Explore exits to large industrial and IIoT leaders

⁸ ARM Press Release, *ARM Acquires Apical - a Global Leader in Imaging and Embedded Computer Vision*, May 2016

⁹ Wall Street Journal, *SoftBank Bets on Internet of Things With ARM Deal*, July 2016

¹⁰ Harman International Press Release, *Harman Completes Acquisition of TowerSec Automotive Cyber Security*, March 2016

***Who will lead and who
will lag? It all comes
down to decisions.***

It's clear that the rapidly emerging IIoT presents compelling opportunities for both corporations and private equity investors. But seizing those opportunities calls for sound decisions about which capabilities to acquire, which business models to pursue, and which partnerships to develop. Making the right calls will distinguish those who lead from those who lag in the new industrial economy.



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