# The Cost of Being Late to the IoT

**VDC|Research**
Insights for the Connected World

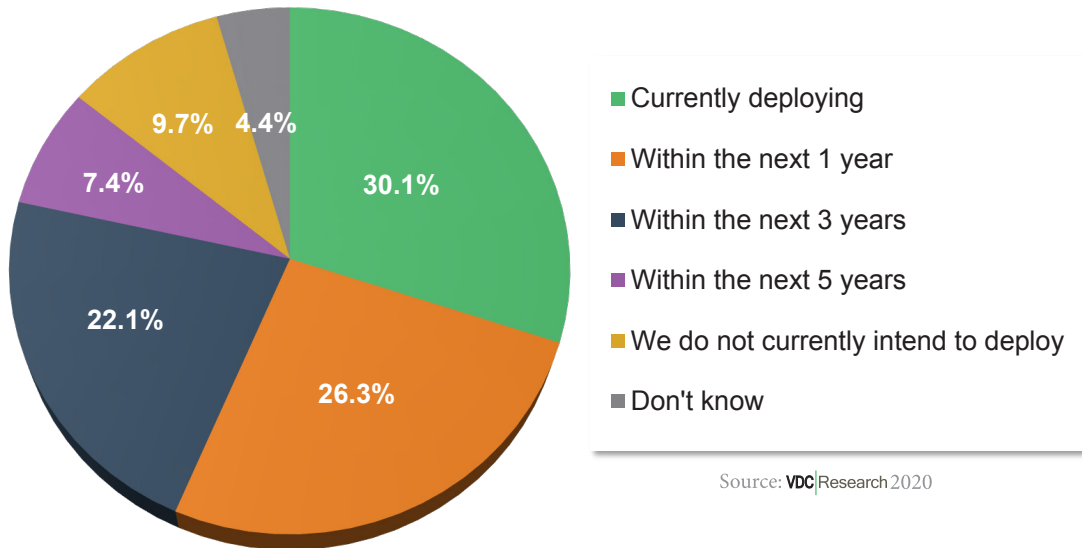# IoT Transformation & the Cost of Being Late

Digital transformation and the IoT are impacting all corners of the product manufacturing market. In fact, within 3 years, 78% of engineering organizations expect their product to leverage the IoT in some way. From functionality and service improvements to business model changes, IoT adoption is reshaping the engineering ecosystem, across device categories as diverse as industrial automation systems, consumer electronics and medical devices. While this change can be seen across industry segments, the breadth and depth of IoT adoption remains uneven between markets and even between peer organizations.

*Exhibit 1: When Respondent's Organization Intends to Deploy IoT Capability and/or Applications into its Products (Percent of Respondents)*



- Currently deploying — 30.1%
- Within the next 1 year — 26.3%
- Within the next 3 years — 22.1%
- Within the next 5 years — 7.4%
- We do not currently intend to deploy — 9.7%
- Don't know — 4.4%

Source: VDC Research 2020

With only 30% of surveyed engineers reporting IoT deployments, many organizations are still assessing their own paths forward, attempting to identify the appropriate proof of concept or perfect a new service-oriented business model. Unfortunately for some of these organizations, their future perfectly planned IoT implementation will be too late. Competitors are advancing in their absence and customers are adapting without them. Aside from delayed (or lost) opportunities to drive sales, organizations who delay their IoT implementation are risking the loss of brand equity in the market in the eyes of their customers as well as the ensuing development efficiencies and cost savings early adopters are already reporting. Over the course of this paper, we highlight some of the opportunities IoT presents as well as the costs engineering organizaitons face from waiting to implement IoT in today's rapidly advancing market.

## Background on VDC Research

VDC has been covering the engineering technology market since 1994. The analysis supporting discussions in this paper is based on VDC's ongoing research in this market and findings from a survey of product decision-makers, developers and engineers. This survey, capturing the input from over 700 respondents, offers insight into leading business and technical trends impacting product engineering organizations as well as the best practices implemented to address them. The respondents are based across a range of industries including automotive, aerospace and defense, telecom, medical, industrial automation, and consumer electronics, among others.
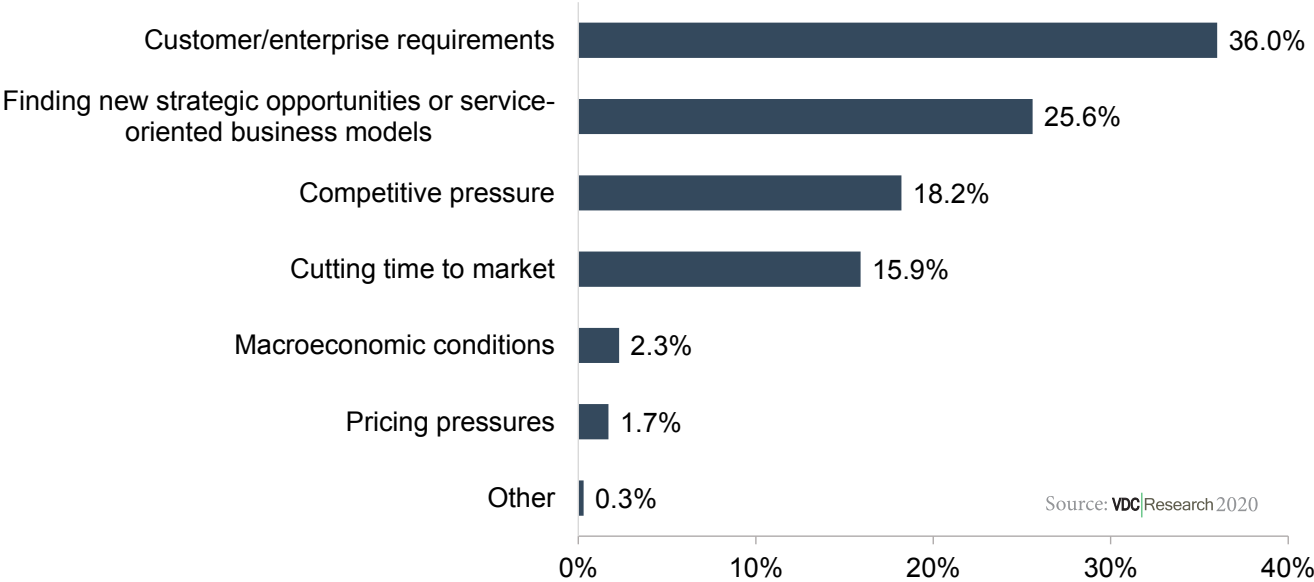
# The Industrial Evolution

Traditional industrial sectors are at a point of transformation. The IoT implementation progress, goals, and achievements vary across the engineering landscape. The universally transformational potential of the IoT, however, is clear, with an increasing number of tangible success stories set to drive further innovation and adoption going forward. For example, firms within the industrial automation industry are investing in new levels of automation in smart factory environments, new investments in re-envisioned MES systems, and new ambitions for edge data capture and analysis. The energy and utilities sector has also been an early mover in this dynamic. With many firms managing sites and rigs that are geographically distributed and isolated, efficient and insightful remote monitoring and data collection is not only logistically necessary, but can also offer a mechanism for increasingly-desired business model transformation. More organizations in this fragmented, resource-focused industry are now selling different packages of data streams to different customer types (from drilling contractors to field operators and owners, etc.), allowing them to shift from hardware-focused sales to ones centered-on or augmented by scalable data services. The healthcare industry is also changing rapidly, from disaggregated point medical device solutions to more comprehensive, connected healthcare systems. This new desire for intelligent data management, sharing, and protection is driving new needs for new infrastructure to support the development of more complex, interconnected and secure systems.

*Exhibit 2: When Respondent's Organization Intends to Deploy IoT Capability and/or Applications into its Products (Percent of Respondents)*



Source: VDC Research 2020
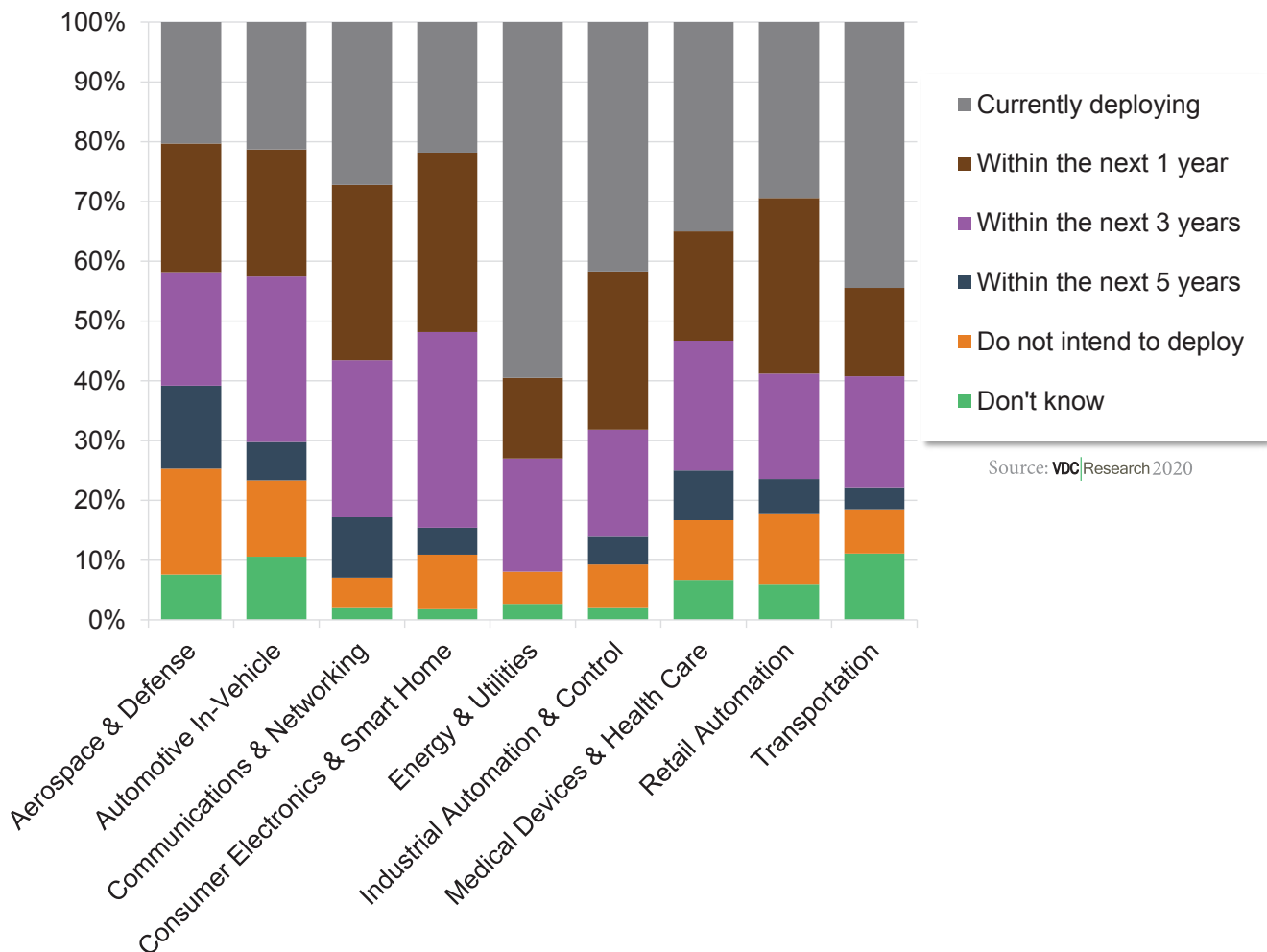
While the motivations for IoT functionality vary across industries, it is universally reshaping the ways these organizations are providing value to their end customers. In fact, 25% of respondents to VDC's survey indicate that they are looking for new strategic ways to help their customers. What is perhaps a more pressing catalyst for change, however, is the need for organizations to implement IoT projects as a means to stay relevant and compete with their peers. In this competitive landscape, the cost of waiting to change is growing and multifaceted. Eighteen percent of respondents already cite competitive pressure as the primary motive for their IoT adoption. As we look forward, this industry shift is rapidly redefining not only the landscape of competition, but also the economic variables calculus needed to drive both sales and operational efficiencies.

*Exhibit 3: Primary Factor Driving Organization Towards Utilizing and/or Providing IoT Solutions*
*(Percent of Respondents)*

| Factor | Percent |
|---|---|
| Customer/enterprise requirements | 36.0% |
| Finding new strategic opportunities or service-oriented business models | 25.6% |
| Competitive pressure | 18.2% |
| Cutting time to market | 15.9% |
| Macroeconomic conditions | 2.3% |
| Pricing pressures | 1.7% |
| Other | 0.3% |

Source: VDC Research 2020

# IoT Recasting Development Economics

IoT development is moving many organizations into uncharted territory. They lack either the resources or expertise to efficiently bring IoT solutions to market. VDC's survey of professionals at engineering organizations highlighted development resources and cost as the largest challenges for IoT solution development within the engineering community. Many development organizations are simply not experienced enough with communications technologies or the security implications of connected systems to efficiently bring these next generation products to market. In some cases, new development and capacity challenges can exacerbate already taxing time-to-market challenges.

*Exhibit 4: Adherence to Current Project Schedule*
*(Percent of Respondents)*



Legend:
- > 6 months ahead of schedule
- 3-6 months ahead of schedule
- < 3 months ahead of schedule
- On schedule
- < 3 months behind schedule
- 3-6 months behind schedule
- > 6 months behind schedule
- Don't know

Pie chart values: 1.0%, 8.8%, 18.9%, 9.9%, 34.0%, 12.8%, 8.2%, 6.4%
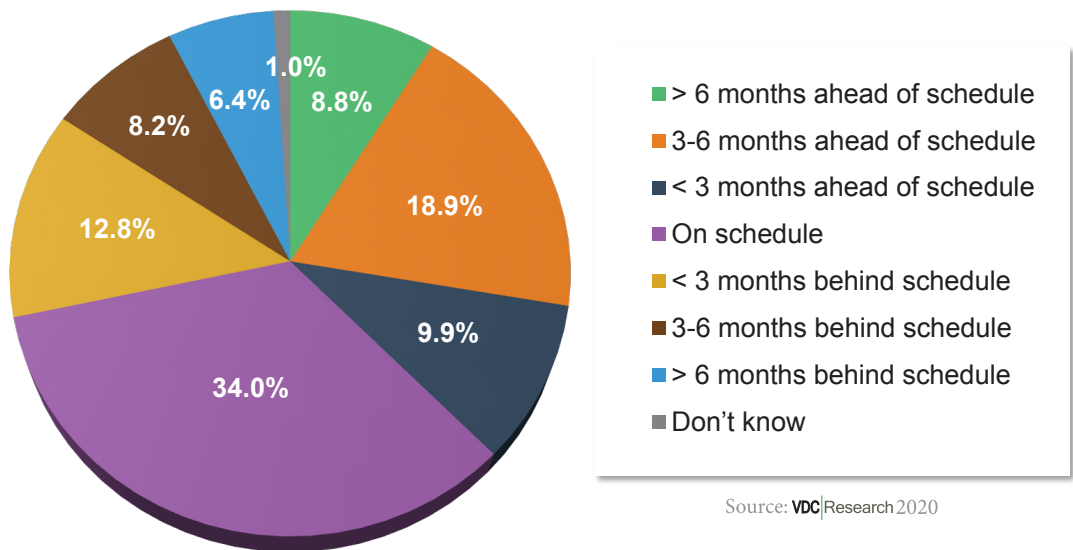
Source: VDC Research 2020

With over one-third of projects already reported as late, scheduled adherence remains a significant obstacle for product development organizations. Performance against this metric has improved over the past few years, however, as demonstrated by 71% of respondents who indicated improvement versus past projects. Much of this improvement seen to date can be attributed to the adoption of new development technologies and methodologies, such as IoT cloud platforms and integrated lifecycle management solutions (e.g. requirement management and modeling tools, etc.). The magnitude of IoT-fueled business and development requirement changes, however, will necessitate additional change to maintain and or improved upon current schedule adherence levels.

## Investment in Innovation

In the same way that software once replaced hardware as a primary area for development resource allocation and investment, a new vector for change is emerging. More organizations are pouring time, money and resources into cloud software and analytics. There are still, of course, organizations who have no current plans for IoT implementation. Our research shows that those organizations still put proportionally more labor into hardware engineering tasks. Although those organizations certainly are still investing in software, IoT implementers are building assets of new IP and organizational capital in cloud software and analytics – the areas most often cited to VDC as important areas of future investment. The accumulation of these additional resources by early IoT movers will only make it more difficult for later IoT adopters to catch up in the future. In other words, the cost of waiting not only included lost sales today, but also future lost sales as competitors build up differentiating IP.

Exhibit 5: Estimated Percent of Engineering Development Costs Spent on Specific Tasks
(Average of Respondents)

Source: VDC Research 2020
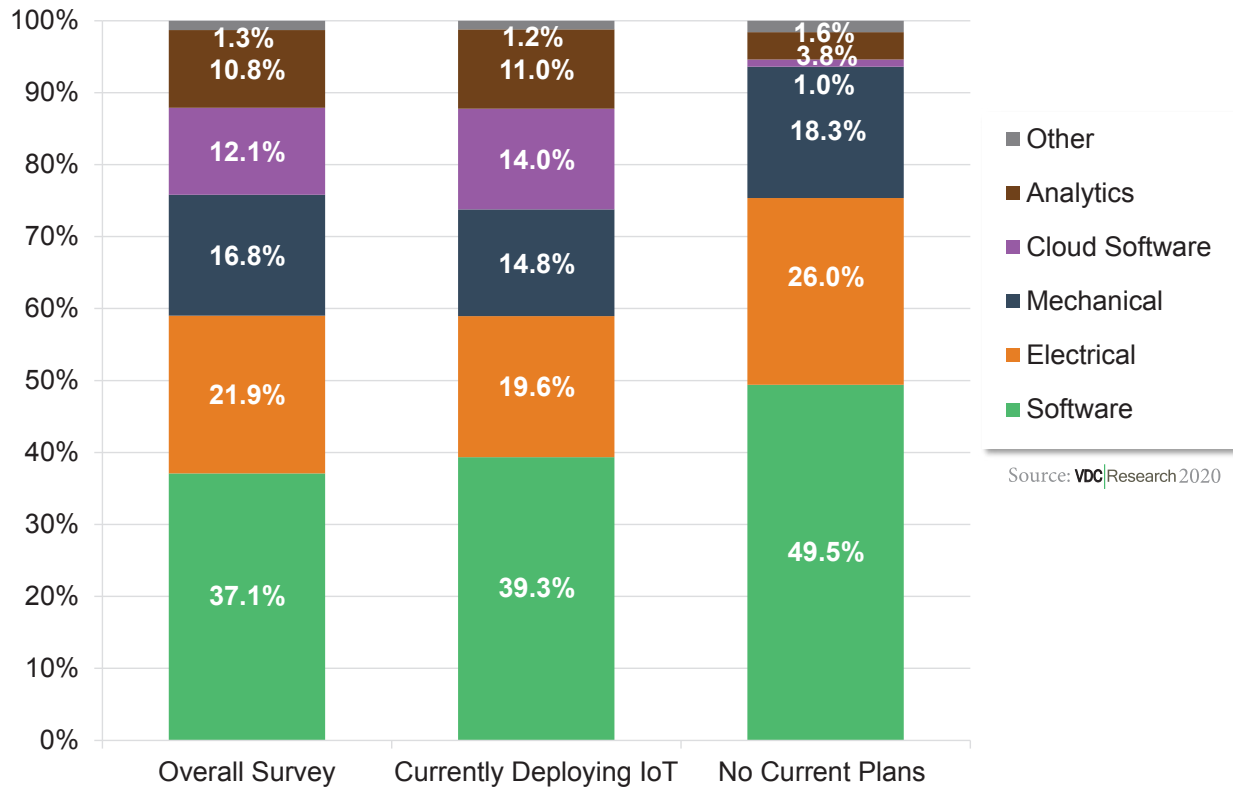
Regardless of what the distribution of development costs can tell us about organizational innovation, controlling their accrual remains critical for any stage organization. Development timelines can be impacted by many factors, but clearly their reduction presents tangible costs savings as well as the opportunity to accelerate sales with earlier market entry. While one would assume that IoT-enabled products would hold an advantage in feature comparisons over less advanced offerings, it is not as intuitive that those products often reach market faster. In fact, our research showed that those organizations currently deploying IoT also report shorter development cycles, with schedules approximately 10% shorter than their non-IoT counter parts. With the median total cost of development for our survey cited at $250,000, that difference alone translates to an average of more than $33,000 in savings – or about $21,000 per project month.



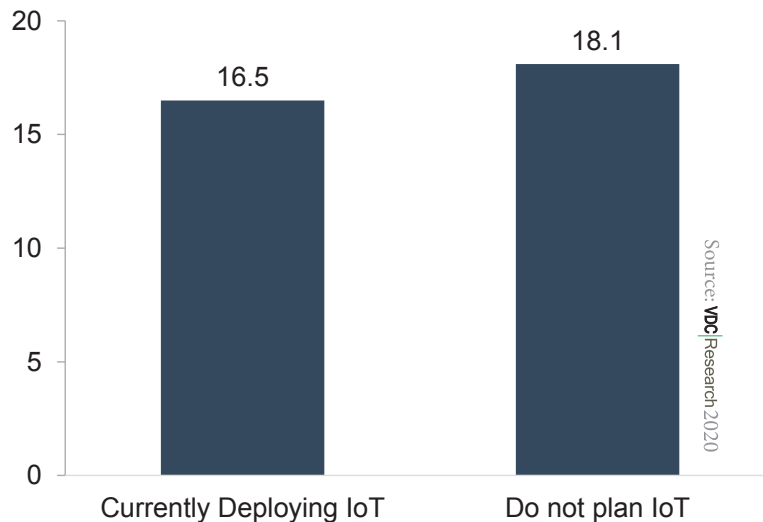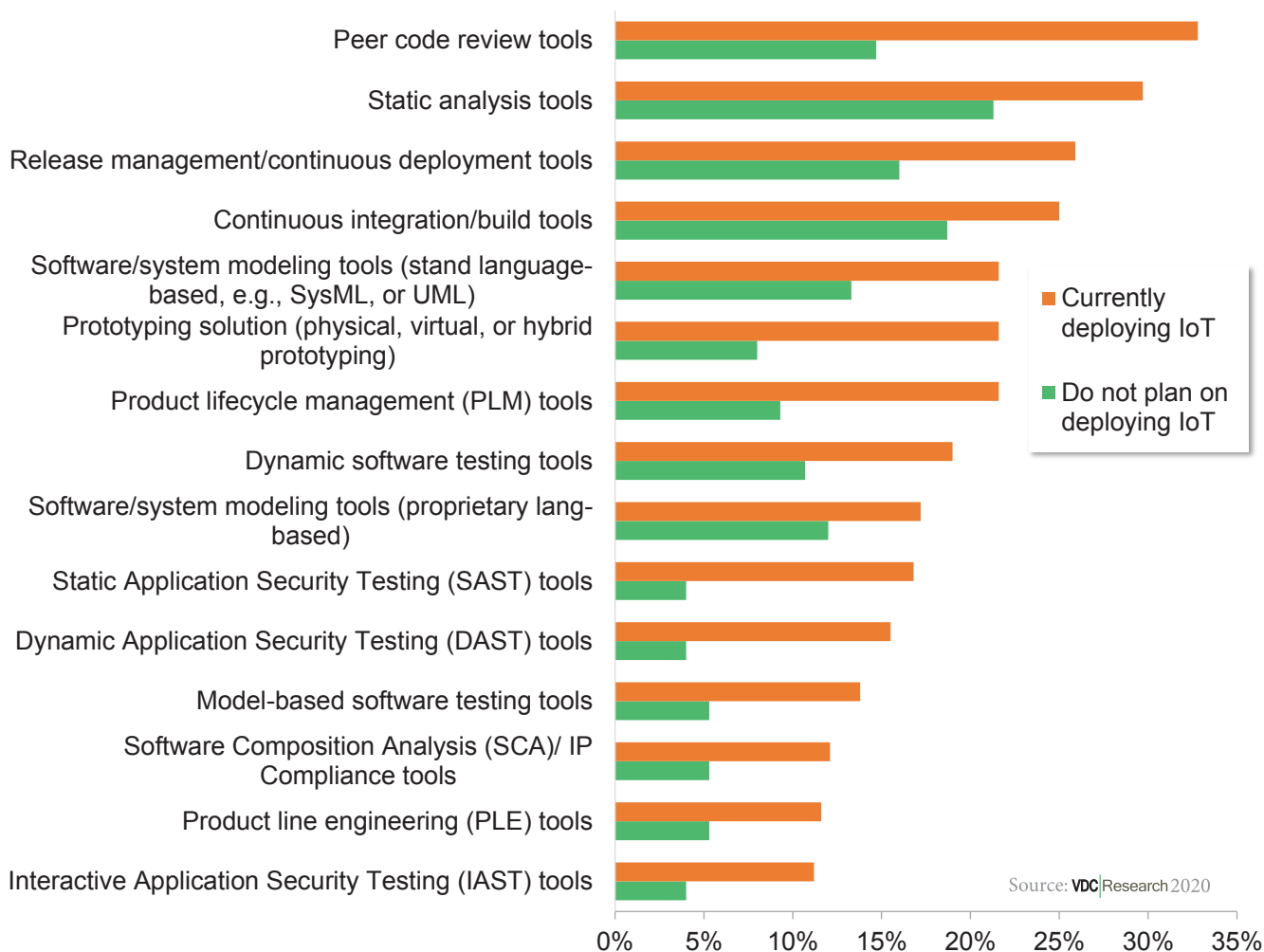Exhibit 6: Estimated Length for Current Project (In Months)
(Average of Respondents)

Source: VDC Research 2020

**Exhibit 7: Tools used on Current Project**
*(Percent of Respondents)*



Chart legend:
- **Currently deploying IoT** (orange)
- **Do not plan on deploying IoT** (green)

Categories (top to bottom):
- Peer code review tools
- Static analysis tools
- Release management/continuous deployment tools
- Continuous integration/build tools
- Software/system modeling tools (stand language-based, e.g., SysML, or UML)
- Prototyping solution (physical, virtual, or hybrid prototyping)
- Product lifecycle management (PLM) tools
- Dynamic software testing tools
- Software/system modeling tools (proprietary lang-based)
- Static Application Security Testing (SAST) tools
- Dynamic Application Security Testing (DAST) tools
- Model-based software testing tools
- Software Composition Analysis (SCA)/ IP Compliance tools
- Product line engineering (PLE) tools
- Interactive Application Security Testing (IAST) tools

Source: VDC Research 2020

*Note: Not all tool type response choices displayed above.*

IoT initiatives alone are not generating all of these savings, however. These more advanced IoT-implementing organizations often show a parallel adoption of more commercial runtimes as well as more sophisticated tools, driving synergistic efficiency. For example, IoT implementers are 50% more likely to use continuous integration tools, nearly three times as likely to use virtual prototyping tools, and more than two times as likely to use PLM or PLE tools as compared to those organizations with no current plans to implement IoT. As a result, we see IoT becoming more than just a potential sales accelerant. IoT is increasingly becoming an organizational change agent, ushering in operational transformation capable of reinforcing nearly every organizational goal. Consequently, IoT implementation delays can have the reverse effect, reducing revenues, increasing cost, and styming innovation.

## More Predictability in Project Performance

Many engineering organizations accepted long ago that a significant portion of project starts would result in delays if not eventual cancelations. Advances in efficiency have often been met by offsetting increases in project complexity and requirements. Project schedule overruns can be a huge cost driver for organizations, but the lack of predictability presents its own significant issues, impacting future project resource allocation planning as well as go-to-market sales and marketing initiatives. In this context, it is both surprising and encouraging to see that IoT implementers are reporting success, with their projects more likely to be on time or ahead of schedule than those undertaken by those organizations with no current IoT plans (See Exhibit 7). In fact, 68% of IoT projects were on-time or ahead of schedule as compared to only 45% of those projects by engineering organizations who had no IoT implementation plans. These schedule and

time-to-market data are even more compelling considering the complexity involved in many IoT projects, often involving new functionality and business goals. It is now becoming clear that waiting to implement IoT – and taking advantage of the available supporting technology in the ecosystem – can actually have indirect, negative impacts on development efficiency and schedules.
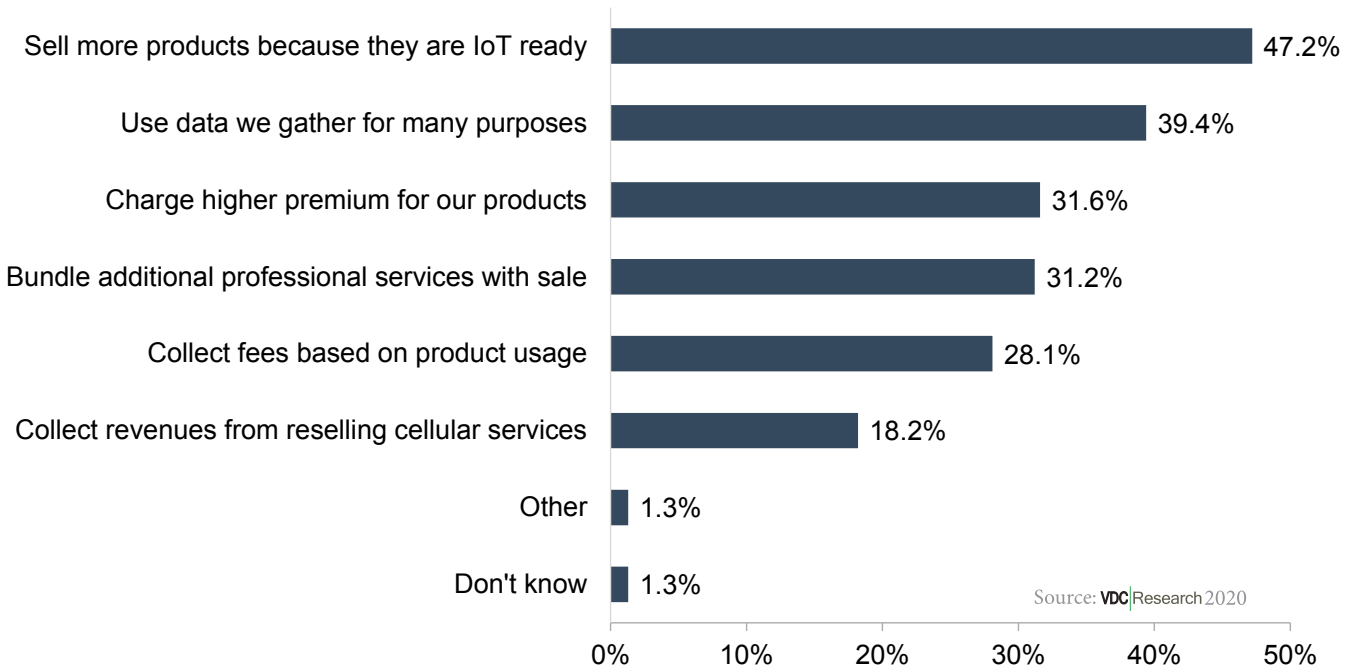
*Exhibit 8: Current Project's Schedule*
*(Percent of Respondents)*



Source: VDC Research 2020
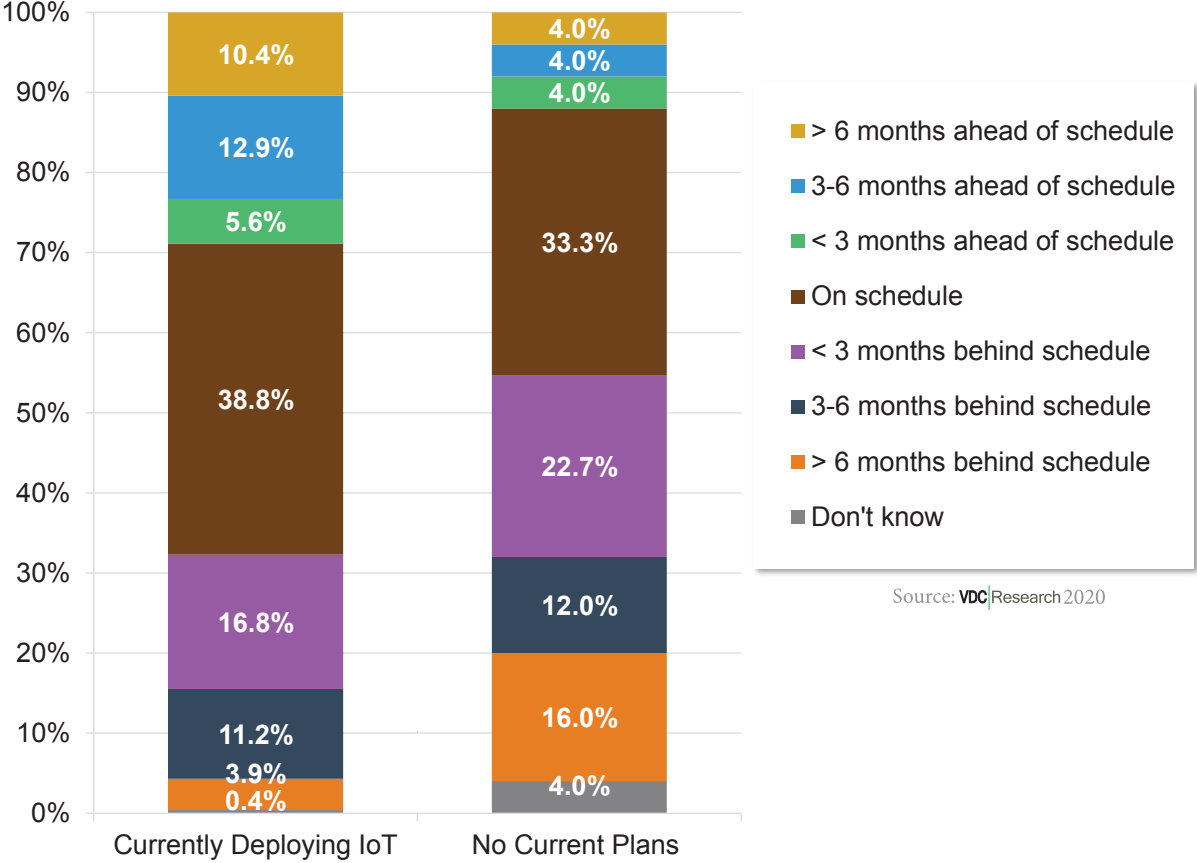
## Recognizing Revenue Potential

From asset location tracking, to predictive maintenance to usage-based services, engineering organizations are finding many ways to monetize IoT. The industry has largely moved past the "solution looking for a problem" phase, with most IoT organizations effectively able to drive net new revenue streams from their IoT initiatives. These new sales can take a variety of forms based on industry, from cellular service reselling to usage-based billing to predictive maintenance. However, one of the largest areas of return is simply the ability to better compete against other firms. Forty-seven percent of respondents indicated that they can sell more products that are IoT enabled. Furthermore, nearly a third indicated they could charge more for their products based on said functionality. While IoT impacts vary by organization and implementation, it is clear that the opportunity has become substantial and multifaceted, with implementation dealys having tangible lost revenue costs.

*Exhibit 9: Ways IoT Most Impacts Respondent's Organization's Business Prospect. IoT Enables Organization to…*
*(Percent of Respondents)*

| Category | Percent |
|---|---|
| Sell more products because they are IoT ready | 47.2% |
| Use data we gather for many purposes | 39.4% |
| Charge higher premium for our products | 31.6% |
| Bundle additional professional services with sale | 31.2% |
| Collect fees based on product usage | 28.1% |
| Collect revenues from reselling cellular services | 18.2% |
| Other | 1.3% |
| Don't know | 1.3% |

Source: VDC Research 2020

# Conclusion

Product manufacturing organizations are at a clear cross roads. They can either adapt or fall further behind. Seemingly all markets are in the depths of IoT adoption. Early adopters are fulfilling the vision of new revenue stream generation and higher win rates in traditional product categories. Furthermore, our research shows that IoT-implementing firms are navigating these new goals while also being able to achieve tangible development cost efficiency savings. The IoT ecosystem is rapidly becoming filled with solutions to help organizations adapt and efficiently deploy IoT functionality. In fact, IoT projects are more likely to be on-time and are completed faster than by those organizations with no current plans to adopt to this increasingly important dynamic. Additionally, what were once more debatable and less discernable costs are coming into focus, as the risk of devaluation of brand equity versus more progressive peers is becoming a real and recognized threat for many businesses. The cost of waiting to implement IoT has never been higher.

## Think Big, Start Small, Succeed Quickly.

As we discussed above, IoT adoption does not come without challenges. New functionality, skillsets and technology stacks often leave organizations feeling strapped for resources and looking for better ways to leverage existing technology and IP. Given these considerations, it becomes imperative to build a stepwise migration to IoT end goals, focusing on developing proof of concepts and assuaging common concerns like security. The demonstration of short-term success stories such as these can provide more momentum to and internal evangelists for broader IoT initiatives.

| Challenge | Percent |
|---|---|
| Lack of manpower / technical skills | 11.7% |
| Enabling greater security | 10.0% |
| Specifying / understanding customer requirements | 9.7% |
| Extending legacy embedded technologies for IoT | 8.5% |
| Reducing cost | 7.7% |
| Improving performance | 7.4% |
| Cloud / data center integration | 7.0% |
| Lack of mature commercial development solutions | 5.8% |
| Minimizing connectivity expenses | 5.8% |
| Having adequate storage | 5.0% |
| Coordination with external solution providers or ISVs | 4.5% |
| Reducing power consumption | 4.5% |
| Lack of strong standard / certification guidance | 4.4% |
| Unreliable third-party connectivity providers | 3.8% |
| Minimizing footprint of hardware | 3.4% |

Source: VDC Research 2020

From a technology perspective, certain tools have shown particular value in addressing the complexity associated with IoT projects. In addition to the use of lifecycle management tools mentioned above, VDC's past research has consistently demonstrated that the use of IoT platforms help further accelerate development and time to value for engineering organizations as well as for the customers that ultimately will use the products. Moreover, data collected from IoT deployments also serves as feedback into the development process, helping organizations update their existing products and refine future product generations. Regardless of the potential IoT implementation aid offered by these technologies, it is abundantly clear that cost of waiting to implement IoT projects has become damaging enough on its own to necessitate action.

# About The Author

**Chris Rommel** is responsible for syndicated research and consulting engagements focused on development and deployment solutions for intelligent systems. He has helped a wide variety of clients respond to and capitalize on the leading trends impacting next-generation device markets, such as security, the Internet of Things, and M2M connectivity, as well as the growing need for system-level lifecycle management solutions. Chris has also led a range of proprietary consulting projects, including competitive analyses, strategic marketing initiative support, ecosystem development strategies, and vertical market opportunity assessments. Chris holds a B.A. in Business Economics and a B.A. in Public and Private Sector Organization from Brown University.

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# About VDC Research

Founded in 1971, VDC Research provides in-depth insights to technology vendors, end users, and investors across the globe. As a market research and consulting firm, VDC's coverage of AutoID, enterprise mobility, industrial automation, and IoT and embedded technologies is among the most advanced in the industry, helping our clients make critical decisions with confidence. Offering syndicated reports and custom consultation, our methodologies consistently provide accurate forecasts and unmatched thought leadership for deeply technical markets. Located in Natick, Massachusetts, VDC prides itself on its close personal relationships with clients, delivering an attention to detail and a unique perspective that is second to none.

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