The Third Industrial Revolution: Intelligent Devices, Software, and the Internet of Things
Contents

Introduction ........................................................................................................................................... 3
Challenges Inviting Change .................................................................................................................. 3
Vive La Revolution: Device Makers Massively Adopting Intelligent and Internet of Things Capabilities ................................................................................................................................. 4
A Revolution in Value Creation ......................................................................................................... 5
Monetizing Embedded and External Software Apps Fueling New Revenues in the Third Industrial Revolution ................................................................................................................................. 6
Third Industrial Revolution Enabling Shift from Products to Solutions ........................................ 8
Security is Top of Mind Amidst Revolutionary Change ....................................................................... 10
Conclusion ........................................................................................................................................... 11
Infographic ........................................................................................................................................ 12
Survey Background ........................................................................................................................... 13
Methodology and Sampling ............................................................................................................... 13
Survey Demographics ....................................................................................................................... 13
Location of Respondents ................................................................................................................... 13
Respondents’ Vertical Market ............................................................................................................. 14
Software Licensing and Provisioning Research at IDC ................................................................... 16
About Flexera Software ..................................................................................................................... 16
The Third Industrial Revolution: Intelligent Devices, Software, and the Internet of Things
A Report by Flexera Software with input from IDC

Introduction
The first industrial revolution ushered in a global transformation as the means of production transitioned from human labor to machine driven automation. The second industrial revolution accelerated change through the growth of the railroads, iron and steel production, manufacturing automation, the use of steam power, oil, electricity, and electrical communications.

Pundits argue about the defining attributes and timeline of the third industrial revolutions – but few question that it is unfolding before us as we speak. The proliferation of computers and software digitized the previously analog economy, and brought with it unprecedented levels of automation, productivity and innovation. With the introduction of embedded software and app-driven hardware into manufactured devices, and the ability, through software licensing, to monetize those device functions and features – devices have become intelligent solutions and capable of generating completely new types of revenue streams. Connecting those intelligent devices to the Internet (the “Internet of Things”) is accelerating the third industrial revolution by enabling services, solutions and big data offerings around every day industrial and consumer goods.

So the question remains – has the third industrial revolution already swept through the manufacturing sector, is it just in the beginning stages – or is it still largely promise and hype? That is the question addressed by this report.

Challenges Inviting Change
Major technology innovations don’t necessarily usher in technological revolutions. The conditions have to be ripe – businesses must be open to radical change. One indicator of receptivity is the extent of the challenges they are currently facing. The more pain – the more open enterprises are to new innovations to remedy existing challenges.

According to the survey, device makers are indeed experiencing a broad range of challenges. 48 percent reference the need to make more money among their biggest challenges. Agility is also a major pain point – 47 percent say reducing time to market for creating new products/enhancements, and 47 percent say enhancing their ability to react quickly to changing market needs and/or new market opportunities are major challenges. Other pain points include security (42 percent) and reducing manufacturing costs (40 percent).

1 For ease of viewing all data presented in charts for this report are rounded to the nearest whole percentage point.
Vive La Revolution: Device Makers Massively Adopting Intelligent and Internet of Things Capabilities

If conditions are ripe for transformative technologies to take hold, the question remains – are those technologies actually being adopted?

Perhaps the two most revolutionary advances in recent years to hit the device manufacturing industry revolve around intelligent and Internet-connected “Internet of Things” (IoT) technologies. Intelligent devices are defined as physical devices that include embedded software (or external software applications) that control product features, function and/or capacity. Internet of Things devices are Internet-enabled devices that help accomplish specific user scenarios by bringing their data and functionality together with other devices.

Intelligent and IoT devices also leverage software, software licensing & entitlement management, and Internet connectivity in ways that address many of the big challenges respondents reported earlier in this report. For instance, leveraging software and software licensing, manufacturers can turn device features and/or capacity on and off as appropriate, allowing them to charge customers for capabilities they want, while not charging for capabilities they don’t. Managing entitlements also plays a key role. For instance, knowing which customers have which features turned on allows the device makers to target segments of users for cross/up-sell opportunities. Leveraging licensing and entitlement management, therefore, gives device manufacturers many more options to monetize features and functionality, allowing them to:
• Produce different products on the same hardware chassis, driving down costs by eliminating the need for additional production lines and minimizing the number of SKUs that have to be kept in inventory.
• Create innovative products on existing hardware chassis. This reduces the cost and time to bring differentiated products to new or existing markets.
• Up-sell existing customers by electronically activating additional device capabilities or capacity. This makes it easier to capitalize on incremental revenue opportunities.
• Meet evolving customer needs without requiring them to swap out hardware or otherwise disrupt their operations. This makes for a more positive ongoing customer experience.

According to the survey, a significant proportion of device makers have already transformed their product lines to make them intelligent and connected. 50 percent of respondents say they develop intelligent devices today, and 30% say they currently manufacture Internet of Things devices today.

But the trend line is steeply rising – indicating that the third industrial revolution is gathering steam. 21 percent of respondents that don’t offer intelligent devices today, say they plan on doing so within the next 12-24 months. Moreover, 34 percent of respondents that don’t offer IoT devices today say they plan on doing so in the next 12-24 months. Vive La Revolution!

![What types of devices do you currently or plan on manufacturing?](chart)

**A Revolution in Value Creation**

Industrial revolutions don’t simply improve what exists – they enable producers to create new value not previously possible – and as a result new products, services, and enter new markets. The survey confirms that device manufacturers already, or plan to, leverage their smart and Internet-connected devices to create a range of services and solutions that would not have been possible with last-generation “dumb” technology.

For instance, 79 percent of respondents say they are or plan on delivering remote monitoring and maintenance. This would enable them to leverage data from sensors on their devices to, for instance,
anticipate the breakdown of equipment and maintenance needs before the breakdown becomes a problem. 66 percent are or plan on delivering Business Intelligence to their customers – leveraging the tsunami of data their devices and sensors generate to deliver actionable intelligence for customers. 37 percent are or will improve their supply chains with these new capabilities – such as automatic replenishment of a depleting product – such as water coolers or printer cartridges. Other value-added scenarios include enhancing the shopping experience (i.e. providing the ability to look up store offers as shoppers pass by) (26 percent), offering content delivery (i.e. infotainment systems in cars) (25 percent), and smart-city use cases (i.e. real-time traffic information) (23 percent).

**Monetizing Embedded and External Software Apps Fueling New Revenues in the Third Industrial Revolution**

While the innovations and use cases now possible with smart and Internet-connected devices serve as the fuel for industrial revolution – there must be an accelerant to ignite that fuel. In a business context that accelerant is the lure of money.

If manufacturers are unable to profit from their innovations—investment in those innovations will cease. If new revenue streams and higher profits emerge – then the revolution will explode and device makers will charge ahead and compete for first-innovator status and market share.

In last-generation devices, device makers were fairly limited in terms of monetization options. Their primary revenues derived from the sale of the hardware device, and perhaps maintenance revenue associated with the purchase. The next big revenue opportunity typically would arise when that device required replacement.
According to the survey, device makers are indeed aggressively adopting new business models associated with monetizing the embedded and external software that’s increasingly powering their intelligent and Internet-Connected devices. And to monetize the software they’re leveraging software licensing and entitlement management – a mainstay in the traditional software industry.

60 percent of respondents use licensing and entitlement management systems to develop new offerings that bundle device, services and/or consulting, and 17 percent more plan on doing so within the next two years.

Software is the vehicle enabling device makers to bundle product offerings, services and feature sets in new and creative ways. For instance, 32 percent of respondents use software to electronically turn features on and off based on purchases (i.e. for $5 a customer can purchase the music player, for $10 the customer can purchase the music player and Internet radio capabilities). 19 percent more plan on doing so within two years. 31 percent use software to leverage data from sensors embedded in devices to uncover new services opportunities (i.e. device repair services, etc.). 28 percent more plan on doing so within two years. 29 percent use that data uncover new sales opportunities (i.e. new product sales). 27 percent more will do so within two years.

Software is also enabling usage-based consumption models – allowing customers to pay based on how much they consume – a concept also gaining steam in the traditional enterprise software market. For instance, 27 percent of respondents monetize their devices by charging by the amount of software that is used on the hardware, and 22 percent more will do so within two years. 22 percent of respondents use software to enable more capacity based on purchases, and 16 percent more will do so within two years.
The Third Industrial Revolution Enabling Shift from Products to Solutions

As device manufacturers seek ways to deepen their relationships with customers, a key goal is to become more strategic and provide ongoing solutions tailored to evolving customer needs. As noted earlier in this report, leveraging software, licensing and entitlement management is enabling greater agility to flexibly package, deliver and sell intelligent and IoT devices. Services are also a critical element to selling solutions. For instance, medical device makers can use big-data to provide better diagnostics based on segmenting national, socio-economic or ethnic characteristics of an overall population pool. Or auto manufacturers can equip their cars with every feature and upgrade available – and simply turn on or off the feature via software and licensing based on what the customer has purchased. In these scenarios, the device maker can make a strategic decision about whether or not to monetize a feature or to provide it at no cost.
According to the survey, over the next two years the proportion of revenue associated with services is poised to increase for device makers – indicating device makers’ commitment to evolve into solutions providers. 38 percent of respondents say that half or more of their revenues derive from hardware today. That proportion will decrease to 33 percent in the next 12-24 months. 32 percent of respondents say that half or more of their revenues currently derive from services today. That figure will increase to 38 percent in the next 12-24 months.
Security is Top of Mind Amidst Revolutionary Change

Device makers are acutely aware of the risks associated with the rapid change that intelligent and Internet-connected devices are ushering in. It is clear from the survey that device makers are considering the various security risks as they transform their business models.

79 percent of respondents cite secure communications, and 75 percent cite prevention of data leakage and loss, as paramount security concerns. 52 percent say having easy methods for updating software/firmware on a device is critical. This is clearly important to mitigate hacker risk by having easy methods to update vulnerable or compromised software on customers’ devices.

50 percent of respondents say they are concerned about regulations and certification (HIPPA, PCI, FISMA, FIPS, etc.). Nearly half of respondents, 48 percent, are concerned about embedded software IP protection, and 46 percent say proactive monitoring of devices for application issues is important.

What is/will be your organization’s revenue breakdown between hardware, software and services? Within 12-24 months

Security is Top of Mind Amidst Revolutionary Change

Device makers are acutely aware of the risks associated with the rapid change that intelligent and Internet-connected devices are ushering in. It is clear from the survey that device makers are considering the various security risks as they transform their business models.

79 percent of respondents cite secure communications, and 75 percent cite prevention of data leakage and loss, as paramount security concerns. 52 percent say having easy methods for updating software/firmware on a device is critical. This is clearly important to mitigate hacker risk by having easy methods to update vulnerable or compromised software on customers’ devices.

50 percent of respondents say they are concerned about regulations and certification (HIPPA, PCI, FISMA, FIPS, etc.). Nearly half of respondents, 48 percent, are concerned about embedded software IP protection, and 46 percent say proactive monitoring of devices for application issues is important.
Conclusion

Device makers are emerging from a period of significant challenge – characterized by low margins, stiff competition and brittle manufacturing supply chains. Increasingly they are retooling their devices to make them intelligent and Internet-connected, opening up new ways of creating value for their customers. They’re leveraging software, licensing and entitlement management strategies to transform their business models and monetize their innovations. And they’re moving up the value chain to become strategic solutions providers incorporating new products and services into the mix. Through it all, device makers are also keeping an eye on the danger spots – looking at security from all angles.

Call it evolution or revolution. The fact remains that device manufacturing is in the throes of massive and accelerating change that is re-forming the marketplace, creating new competitors, new winners and new losers. And the race is on as existing and emerging competitors jockey to come out on top.
**SOFTWARE, LICENSING AND THE INTERNET OF THINGS: THE NEXT INDUSTRIAL REVOLUTION**

- **30% + 34%**
  THE NUMBER OF INTERNET OF THINGS MAKERS WILL MORE THAN DOUBLE WITHIN TWO YEARS: 30% of device makers develop Internet of Things devices today. 34% more will do so within two years.

- **50% + 21%**
  SOFTWARE-ENABLED INTELLIGENT DEVICES CONTINUE STRONG GROWTH: 50% of device makers develop intelligent devices today. 21% more will do so within two years.

- **79%**
  NEW PRODUCT/SERVICES CATEGORIES ARE BEING CREATED: 79% of respondents say they are or plan on delivering remote monitoring and maintenance to their product/service mix.

- **60%**
  SOFTWARE LICENSING / ENTITLEMENT MANAGEMENT IS KEY TO MONETIZING THE INTERNET OF THINGS: 60% leverage Software Monetization systems to generate revenues from their software-enabled devices.

- **-5%, +6%**
  SERVICES REVENUE ON THE RISE: Over the next two years, the proportion of device makers’ revenues from hardware will decline by 5%, while the proportion from services will increase by 6%.
Survey Background

This report is based on the 2015 Application Usage and Value survey, conducted by Flexera Software with input from IDC’s Software Pricing and Licensing Research division under the direction of Amy Konary, Research Vice President - Software Licensing and Provisioning at IDC. This annual research project looks at software licensing, compliance and installation trends and best practices. The survey reaches out to executives at software vendors, intelligent device manufacturers as well as the enterprises that purchase and use software and devices.

Methodology and Sampling

The data contained in this report is based on three Application Usage and Value surveys, one targeted at independent software vendors (ISVs), one targeted at intelligent device manufacturers, and one at end-user organizations that consume enterprise software. More than 583 respondents participated, including executives and IT professionals from 264 software vendors, 172 hardware device manufacturers and 147 enterprise organizations.

Survey Demographics

Location of Respondents

Of the 583 respondents to the survey, 53 percent reported their division headquarters as being located in the United States. 6 percent were from India, 4 percent from the United Kingdom, 4 percent from Australia & New Zealand, 3 percent from Germany and 1 percent from France.
Respondents’ Vertical Market

Respondents fell across a wide array of vertical markets. With respect to Enterprise Respondents, 20 percent were from the Business/IT Consulting Services industry, 12 percent from the Government/Public Sector and 10 percent were from the education, Financial Services, healthcare, Oil/Gas/Utility industries respectively.
With respect to software vendor respondents, 17 percent were from the financial industry, 16 percent from consumer, and 13 percent from Healthcare/Medical industry.

With respect to hardware device maker respondents, 23 percent are from the telecommunications/network equipment providers industry, 20 percent from the computer...
equipment and peripherals space, and 20 percent from the industrial/manufacturing automation space.

Software Licensing and Provisioning Research at IDC
IDC's global Software Licensing and Provisioning research practice is directed by Amy Konary. In this role, Ms. Konary is responsible for providing coverage of software go-to-market trends including volume license programs, evolving license models, global price management, and licensing technologies through market analysis, research and consulting. In her coverage of software maintenance, subscription, electronic software distribution and licensing technologies, Ms. Konary has been instrumental in forecasting future market size and growth. Ms. Konary was also the lead analyst for IDC's coverage of software as a service (SaaS) for eight years prior to focusing exclusively on pricing, licensing, and delivery. International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. For more information about IDC, please see www.idc.com

About Flexera Software
Flexera Software helps application producers and enterprises increase application usage and the value they derive from their software. Our next-generation software licensing, compliance and installation solutions are essential to ensure continuous licensing compliance, optimized software investments and to future-proof businesses against the risks and costs of constantly changing technology. Over 80,000
customers turn to Flexera Software as a trusted and neutral source for the knowledge and expertise we have gained as the marketplace leader for over 25 years and for the automation and intelligence designed into our products. For more information, please go to www.flexerasoftware.com.