

The Rise of the Smart Product Economy

Making products smart can deliver game-changing innovation, enriched customer experiences and new, across-the board levels of efficiency. From R&D and manufacturing, through distribution and after-sales support, product data is changing how products are built, sold and cared for. Our latest research reveals practical steps business leaders can take to benefit from this quickly intensifying and accelerating trend.



Produced in conjunction with

E·I·U

The Economist Intelligence Unit

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Executive Summary

Whether it is smartphones, smart cities, smart cars or even smart toothbrushes, smart technologies are finding their way into, and around, the everyday things we like to buy. Witness the “smart” Johnnie Walker bottle, which sends a personalized message to every customer who waves a smartphone in front of it, whether it’s a promotional offer (pre-transaction) or a cocktail recipe (post-purchase, once embedded sensors detect the bottle has been opened).¹ The bottle can now be tracked across the supply chain, from its point of manufacture to its point of consumption.

The opportunities unleashed by smart products are seemingly endless for any company seeking game-changing innovation or new levels of efficiency. However, product companies need to get on board, and fast, to ensure they are not left behind in the quickly intensifying and accelerating smart product market. Smart products are emerging across industries and, as the smart whisky bottle example reveals, are already having a profound impact on product development, manufacturing, marketing, sales and the customer experience. If properly instrumented and personalized, smart products not only exude reams of insight on product usage and status across the value chain, but they can also inform continuous product improvements and influence strategic moves into connected and/or radically adjacent markets.

The digital data emanating from smart products is where value – or alchemy – can be found. Imagine the instrumented whisky bottle exchanging data with a chilled glass to help uncover the perfect temperature for that drinking experience. By distilling and applying the insights gleaned from product intersections, manufacturers (and other players in the value chain) can strengthen customer relationships and create new and more profitable sales channels. But along with these opportunities, there is a flipside: Smart products also introduce uncertainty as they dramatically disrupt marketplaces and existing business models.

To understand the smart product phenomenon, Cognizant’s Center for the Future of Work – in partnership with the Economist Intelligence Unit (the research arm of *The Economist* magazine) – surveyed over 200 product design and innovation executives across the U.S.



and Europe to chart the rapidly developing wave of smart products (see full methodology, page 20). Key findings revealed by our investigation include:

- **Smart products offer unprecedented customer insight.** The information that surrounds almost every physical thing reveals how a customer uses, or wishes to use, a product. Companies are using data and analytics to identify the meaningful connections and correlations among the different conditions involved in a product's manufacture, sale and customer experience.
- **Product data radically changes how products are built and sold.** Product data increasingly underpins finer-grain product personalization and richer customer experiences. Smart products reveal insights for remaking how products are built, priced and sold – directly and through channel partners. We predict an “arms race” as various players compete to win control of the customer.
- **Seismic shifts in revenue will impact profitability.** The very newness of the smart product opportunity is throwing traditional business models into a state of flux. New subscription-based services are feeding perceived uncertainties surrounding revenue and margins, and are setting off waves of analysis-paralysis. A new alchemy is at work as decision-makers *believe* smart products are important yet are unsure how to unlock value from them.
- **Mastery with product data and sharing predicate success.** Successful smart product strategies require healthy doses of embedded intelligence to capture and share data across a product's ecosystem, as well as an engrained ability to read customer sentiment and foretell overall market direction. The stakes are very high – a failure to devise a strategy could undermine market relevance over the medium to long term.
- **The start of a new smart product economy has begun.** We predict the rise of an interconnected smart product economy over the next five to 10 years. It's already emerging, as our research shows. Smart products enable tightly interwoven ecosystems and commercial consortia for capturing new opportunities and extending advantage. Companies are already sharing product data and co-investing in smart product development to establish a beachhead and catalyze a business model/ecosystem makeover.



Smart Products Move Mainstream

A slew of newly connected gadgets that are controlled through mobile apps and feed personal data into the cloud are driving a wave of interest in the Internet of Things (IoT). Home automation start-ups, established consumer electronics giants and large venture capital-funded technology companies alike are all gearing up for competition as connected cars and homes, as well as smart cities, emerge before our eyes.

Close examination of the IoT product space reveals the extent to which a billion interconnected devices and products are changing business as we know it.² To witness this, one needs only to look at the manufacturing, healthcare or retail spaces, in which inexpensive sensors and embedded software running across IP networks enable once dumb products to sense, monitor, optimize and regulate themselves in increasingly autonomous and meaningful ways. Examples range from GE's smart turbine,³ to Procter & Gamble, Inc.'s smart toothbrush,⁴ to Babolat's sensor-embedded tennis racket,⁵ to Disney's MagicBand.^{TM 6}

Efficiency, Innovation and Customer Experience Drive Investment

An inordinate amount of interest around smart "things" is focused on wearables such as Google Glass or broad infrastructure initiatives such as the "smart city;" however, our study reveals that the real market for smart products (particularly over the short to medium term) pivots around manufacturing process improvements, product packaging innovation and/or consumer products that communicate and deliver enriched customer experiences.⁷

Respondents said their smart product developments consist of two primary thrusts: making industrial equipment smarter through insights gained from embedding smart products into and around a manufacturing process; and making product packaging smart, by highlighting the expiration status on commodities such as perishable foods, or reminding patients how and when to consume medication (see Figure 1, next page).

Our investigation reveals that the next significant development opportunity (40% of respondents) focuses on making consumer devices smart, such as a fitness band that tracks personal wellness. We believe these initiatives are set to dramatically change the dynamics between product creation and product sale because customer insight and business meaning are flowing through and around product data.

Making Products Smart Creates Value from the Virtual

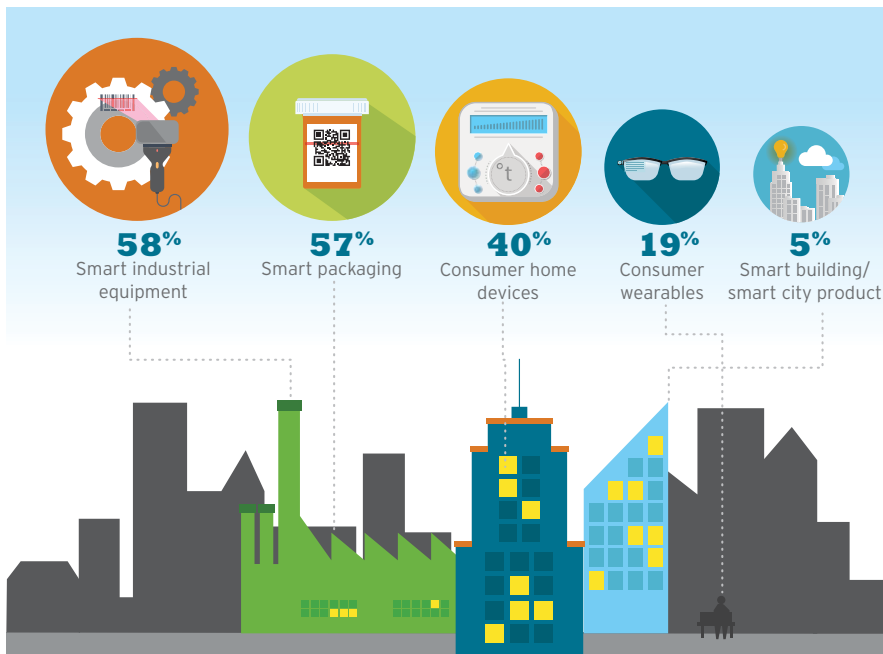
Making a product smart requires new functionalities to be embedded – data generation, collection, processing, transmission and/or reception – either in the product itself or in its packaging. Smart products transmit data, and it’s within the data that the value – or alchemy – is found.

Figure 2, next page, reveals three core elements that elevate products to “smart” status. The physical components of traditional products have always existed, but new “digital components” can now be added to most everyday objects without dramatically increasing their price point.⁸ These digital components include sensors and processors, software controls and data storage that can be accessed through an interface such as a dashboard or app. When combined with IP connectivity, smart products are able to communicate regardless of their location or condition, either in a workflow, in the hands of a customer or installed at a customer’s site.

When products are smart, it means they are instrumented to communicate with one another and with other products and services. This includes the toothbrush that monitors and tracks the user’s brushing performance and provides feedback, or the jet engine that beams live engine data to ground staff, or the connected car that sends driver data to an insurance broker to enable dynamically priced car insurance.⁹ (For more insights, read our white papers “[The New Auto Insurance Ecosystem: Telematics, Mobility and the Connected Car](#)” and “[The Telematics Advantage: Growth, Retention and Transformational Improvement with Usage-based Insurance.](#)”)

Smart Product Development Consumes the B2B Space

Which of the following categories of smart product are you developing or have you developed?

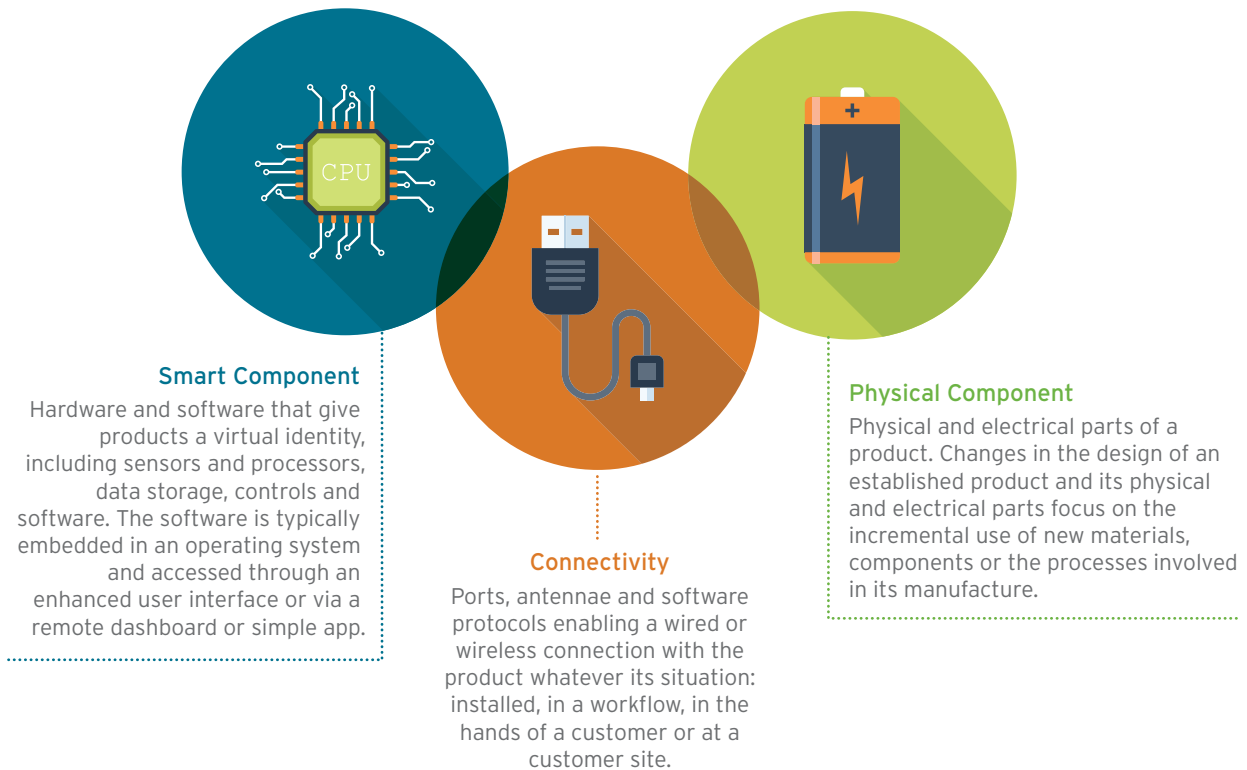


Response base: 205 (multiple responses permitted)

Source: Cognizant/EIU study

Figure 1

Smart Products' Three Core Components



Source: Cognizant
Figure 2

By using data and analytics, companies can now see and predict a product's behavior and, by extension, the wants and needs of its user by interpreting the data and anticipating how a product could solve current and future needs. Our survey reveals that the process of giving a product a virtual identity triggers productivity gains and offers the potential for game-changing innovation.

As product functions become more tightly controlled and optimized, we expect to see the emergence of innovative workflows (or product stacks) that connect the various products with the companies that own and operate them. Visualize this as the opportunity around the connected home, the connected car or the smart city. Each features a stack of products interacting with one another and blending into a unified entity that can be controlled through a single platform or interface by the home owner, driver or city planner. The result is a fully integrated and, in some cases, fully automated solution.

Over the longer term, strategic opportunities for smart products will emerge around these interconnected solutions and the partnerships that underpin them. We view this inevitable disruption to the product model, and the opportunity it creates, as a natural consequence of what Cognizant terms "Code Halo™" thinking.¹⁰

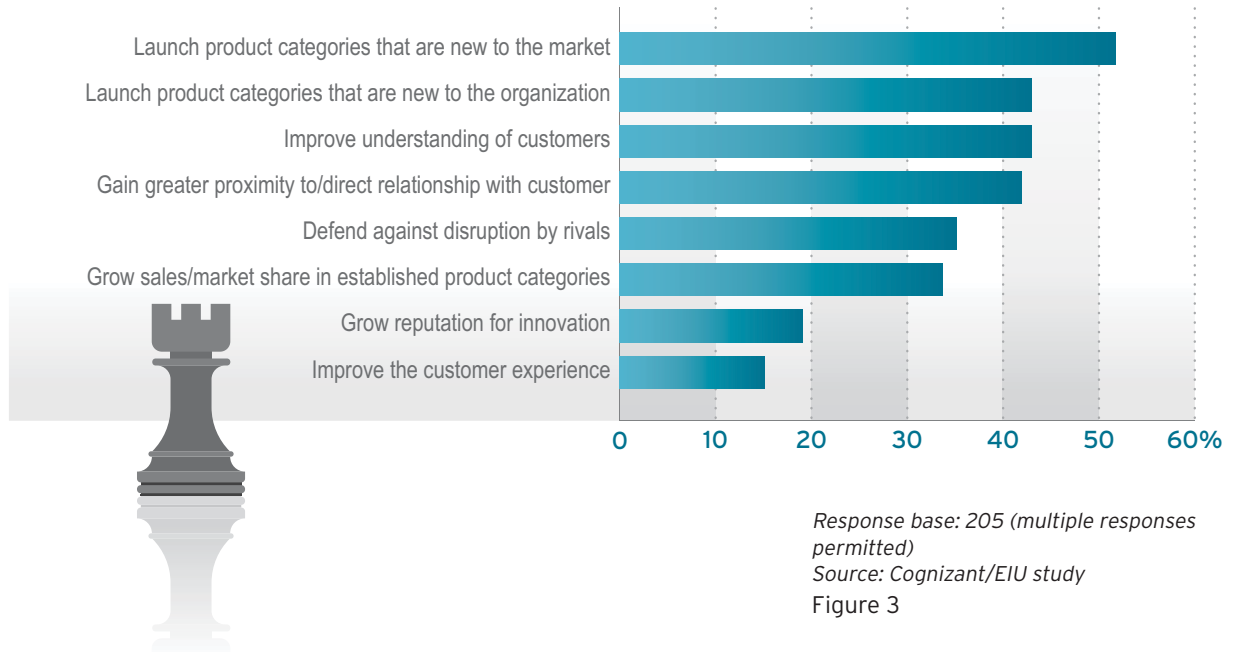
Customer Insight Sparks New Strategic Objectives

It's one thing to turn smart product data into insights; it's yet another to turn those insights into action. The ability to truly understand a customer and embed that understanding into the product development process will separate winners from also-rans as we move further into the smart product economy. Customer insight and understanding are sparking a new set of strategic objectives (see Figure 3).

As respondents integrate their newfound customer intelligence into their product development processes, many expect to accelerate product innovation, whether in the form of entirely new product categories (52%) or products that are new to their company (43%). Improving product personalization is seen as a way to enrich the customer experience.¹¹

Strategic Objectives Emerge Around New Customer Insight

Which of the following are the most important strategic objectives you are pursuing through the development of smart products?



But innovation is not limited to the product itself; the customer-manufacturer relationship is also due for a change. For many respondents (42%), the new types of interactions enabled by smart products are seen as a route to a more direct relationship, which will drastically impact channel dynamics. Sales channels that had traditionally helped manufacturers introduce products and services to the market will be compromised by this radical shift. Who owns the customer relationship: The supermarket with its finger on the pulse of customer shopping habits, or the toothbrush company whose device tracks how well an individual brushes his teeth?

The potential disruption for channel relationships is huge. As the smart products market evolves, we see product ecosystems forming, with various players (parts suppliers, manufacturers, channel partners and retailers) all vying to build and

nurture direct relationships with customers. And it's clear why: Whoever does so controls the customer relationship and pocketbook – extracting value from smart product data. As a result, retailers and manufacturers that do not participate in the smart product phenomenon are exceedingly vulnerable.

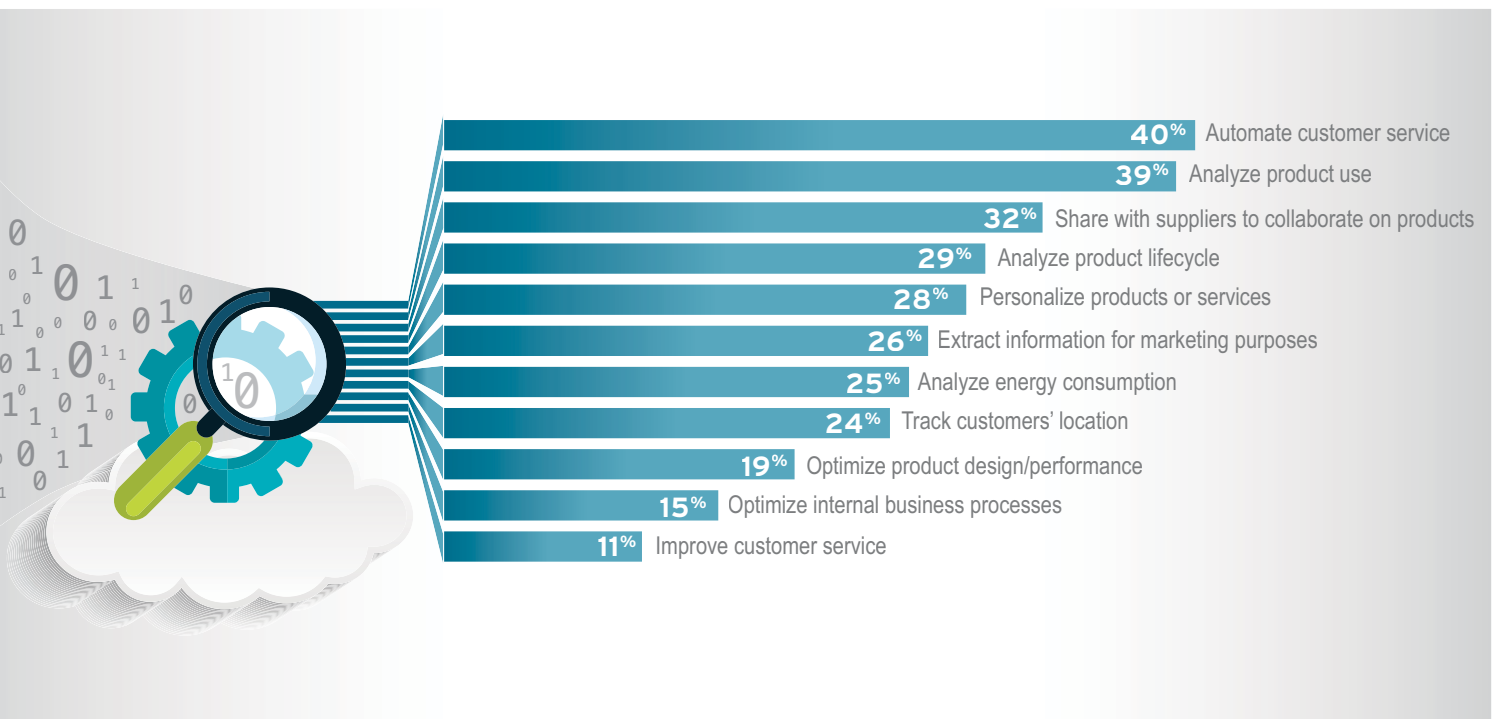
Data Explodes Into Product Processes

The data generated by smart products will be used in numerous ways throughout the product lifecycle, from product design through post-sales service (see Figure 4). More importantly over the longer term, our respondents see value in combining product data with data from third-party suppliers; many are already collaborating with customers and suppliers through co-creation on joint product development and go-to-market approaches.¹²

Our findings reveal that customer service is a primary target when it comes to using smart product data. By analyzing information generated by a product throughout its lifecycle (e.g., log files, queries, configuration changes, etc.), businesses can predict service degradation or interruptions, and reduce the potential for outages. The ability to solve a product problem or query automatically without the time delays of incident-logging or the costs of involving an engineer boosts performance and reduces the cost of problem resolution.

Torrents of Product Data Offer New Waves of Value

Which of the following are the most important ways that your organization uses/will use data collected from smart products?



Response base: 205
(multiple responses permitted)
Source: Cognizant/EIU study
Figure 4

Throughout the product lifecycle, opportunities abound to collect, sort and take action on data to improve its manufacture and distribution, as well as the overall customer experience.¹³ Twenty-nine percent of our respondents use or intend to use data to analyze product lifecycles, and about the same number will personalize their products and services. Even a small amount of intelligence can go a long way, as revealed by the following verbatim quote from an interview conducted following the survey:



“We may make a very traditional object – a bottle of liquid – but it exists in a digital world of connected supply chains and smart supermarket shelves. Building even a small level of intelligence into that bottle allows us to know more about where it is, the people who buy it, when they buy it, where they shop. Even a small amount of intelligence can unlock a Swiss Army Knife of applications and insight.” – V. Balakrishnan, Global Vice President, Digital Innovation, Diageo

One of the more interesting, and somewhat counterintuitive, findings from our research is that many business leaders are keen to share data with suppliers to more effectively collaborate on product and service development and delivery (32%). Though conventional wisdom says consumers are anxious about being “tracked,” our survey suggests that many actively want to be “understood,” assuming, of course, that supply-side understanding leads to improved demand-side value. This is a theme covered extensively in our Code Halos work: the notion of a “give-to-get” value proposition in which consumers will openly engage with a smart product or service if the value of the “get” is sufficiently higher than the “give.”¹⁴ If product data is combined with input from a third-party supplier – or a third-party data feed – then the ability to personalize a product dramatically increases.

An example is a raincoat with an embedded chip that could take a third-party weather feed from a mobile device and ping its owner with the alert, “Take me because it’s going to rain.” The flow of product data and interactions with other systems, processes and third-party insights can unlock a number of new uses and experiences.¹⁵

Software Powers Customer Experiences

Increasingly, the customer’s experience will be influenced by the quality of the smart product’s digital interface. Imagine how customers would react to a product that collects information on their use of it, such as a smart tennis racket that interacts with an app to track swing mechanics? Or the connected car that conveys driver data to dealers, roadside assistance providers or insurance brokers? (The experience screams: “Dear customer, we want *you* to have the best deal on car insurance this year!”)

The digital interface instrumented into the product forms a key part of the product’s experience; the quality of the software, in effect, becomes an extension of the product’s brand. Increasingly, the digital interface will represent not just one brand, however, but multiple brands combined, as products are synchronized through the integration of proprietary product and partner data to form novel, compelling user experiences. The rise of the connected car clarifies this trend, with smart product companies organizing into consortia. This also spurs additional dynamics, such as the fight to control the in-car entertainment interface, which ignited last year with the launch of Apple’s CarPlay and Google’s Open Automotive Alliance.¹⁶

Another example is in the utilities space, in which many providers now offer a connected home solution, in combination with a raft of start-ups specializing in home automation.¹⁷ The bottom line: Software is fast becoming the brand, and a

The quality of the software interactions will be what differentiates one consortium from another.

brand in this context will belong to consortia rather than one company. The interface is rich with diverse and meaningful data, spanning multiple interfaces and connections among various products and their manufacturers.

We believe that this interface will become the new battleground for consortia success. The quality of the software interactions will be what differentiates one consortium from another. Dominance will be attained by consortia with the most intuitive

interface, the best ability to personalize the product experience and a unique capacity to make meaning and drive innovation from the flood of data generated by smart components across the ecosystem.



“We’re at a tipping point. As people become accustomed to the enhanced ‘smartness’ of a product, they get more use from it. And as they get more use from it, they get more value from it, too. Pretty soon, if you’re lucky and you’ve designed your smart product well, the customer will feel that they couldn’t live without it – or at the very least, that they could never go back to using a ‘dumb’ product.” – Jeroen Tas, CEO, Healthcare Informatics, Philips

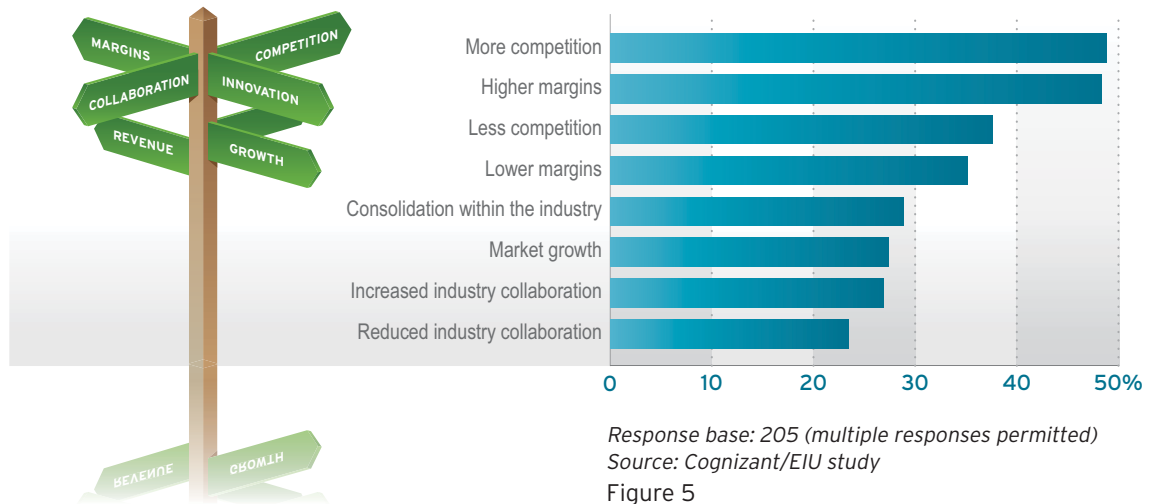
Making Sense of the Smart Product Opportunity

In these early stages of the smart product ecosystem, survey respondents seem uncertain about the impact of smart product deployment, or they see varying implications for their industries (see Figure 5). Most envision higher margins and additional competition; however, more than one-third of respondents expect product margins to narrow and competition to retreat.

Respondents are split on whether a smart product strategy will drive more, or less, collaboration; analysis of the survey data reveals a geographical difference at work, too. European respondents expect their smart product strategies to trigger

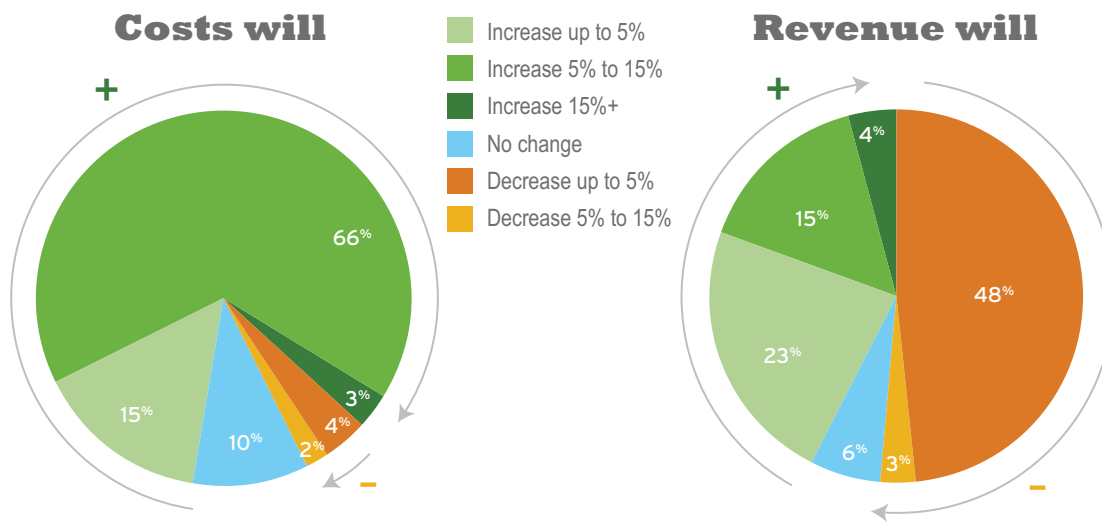
Uncertainty Surrounds the Impact of Smart Products

Longer term, what impact do you think smart product development will have on your industry?



The Fuzzy Outlook

What impact do you expect smart products to have on your revenues and costs in the next three years?



Figures do not add up to 100% due to rounding.
Response base: 203 participants for "Revenue," 204 for "Cost"
Source: Cognizant/EIU study
Figure 6

more collaboration with third-parties than do their U.S. counterparts. U.S. respondents fear more competition from the introduction of smart products than do their European peers.

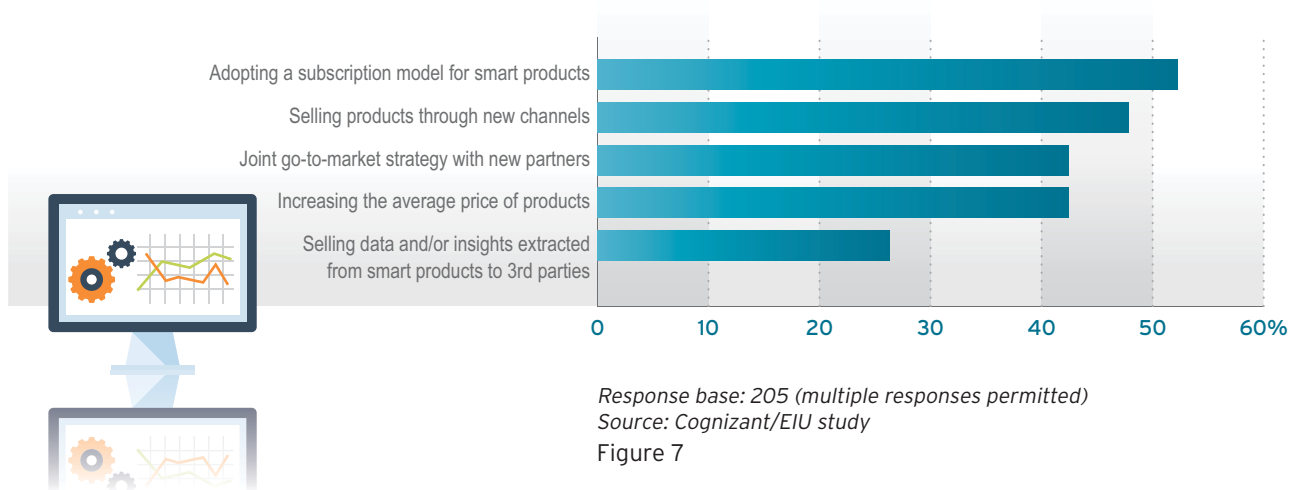
Beware: Uncertain Economics

Seismic shifts in profitability are expected even as uncertain revenue projections and higher costs (at least initially) take their toll. Figure 6 highlights the uncertainty around the economics of a smart product strategy. Roughly two in five respondents (42%) expect overall revenues to increase during the next three years, while half (51%) expect revenues to decrease. In the short term, the top line could decline as shifting business models negatively impact traditional sources of revenue. Smart products are enabling new, subscription-style offerings and offer direct access to customers, but these approaches will disrupt traditional sales channels and traditional revenue streams (see Figure 7, next page).

The consensus on cost is much clearer. A large majority (84%) anticipates a rise in costs (with 66% expecting costs to grow by more than 15%), while a tiny percentage expects costs to fall. The biggest factors influencing the cost of smart products include technology investments to build the back-end infrastructure, the databases to store product interactions, new analytic tools and processes, the platforms for

Smart Products Alter Business Models

How, if at all, have you changed your business model as a result of selling – or deploying – smart products?



building software applications and the service layers linking products (or a multi-product consortia). One respondent notes:



“The process of taking any product and making it smart is expensive. You have to add smart components, you have to add connectivity. But you also need to build software apps to run on the product and integrate it with your back end. You need to provide support for your newly smart product on a 24/7 basis. It all adds up quickly, and that’s the main reason why the market isn’t yet filled with these products.” – Jeroen Tas, CEO, Healthcare Informatics, Philips

Beware: Business Models in a State of Flux

While economic impact is up in the air, the link between smart products and changes to corporate business models is much more clear. This makes sense with the emphasis on data and digitization, which will change how products and services are delivered, consumed and purchased.

For example, pricing, partnerships and delivery channels have all changed as smart products are deployed (see Figure 7). The biggest change is the launch of subscription-style revenue models, which more than half of respondents have enacted. The substitution of subscription-based approaches for traditional “one-off” product revenue models is one reason why respondents are unsure of how smart products will impact the top line.

Pricing models are in flux, as well. While respondents report that pricing is among the most difficult operational challenge of smart products,¹⁸ most agree that smart products will command a higher price than their non-smart predecessors; in fact, 42% said their companies have already increased the average selling price of smart products, and the same proportion expects to do so over the next two years.

We believe that smart products will unleash uncertain market dynamics, challenging business leaders to create effective strategies. The business model changes (e.g., revenue, pricing and channels), as well as the structural industry shifts set off by the explosion of product data, will require an approach crafted for the new digital age.

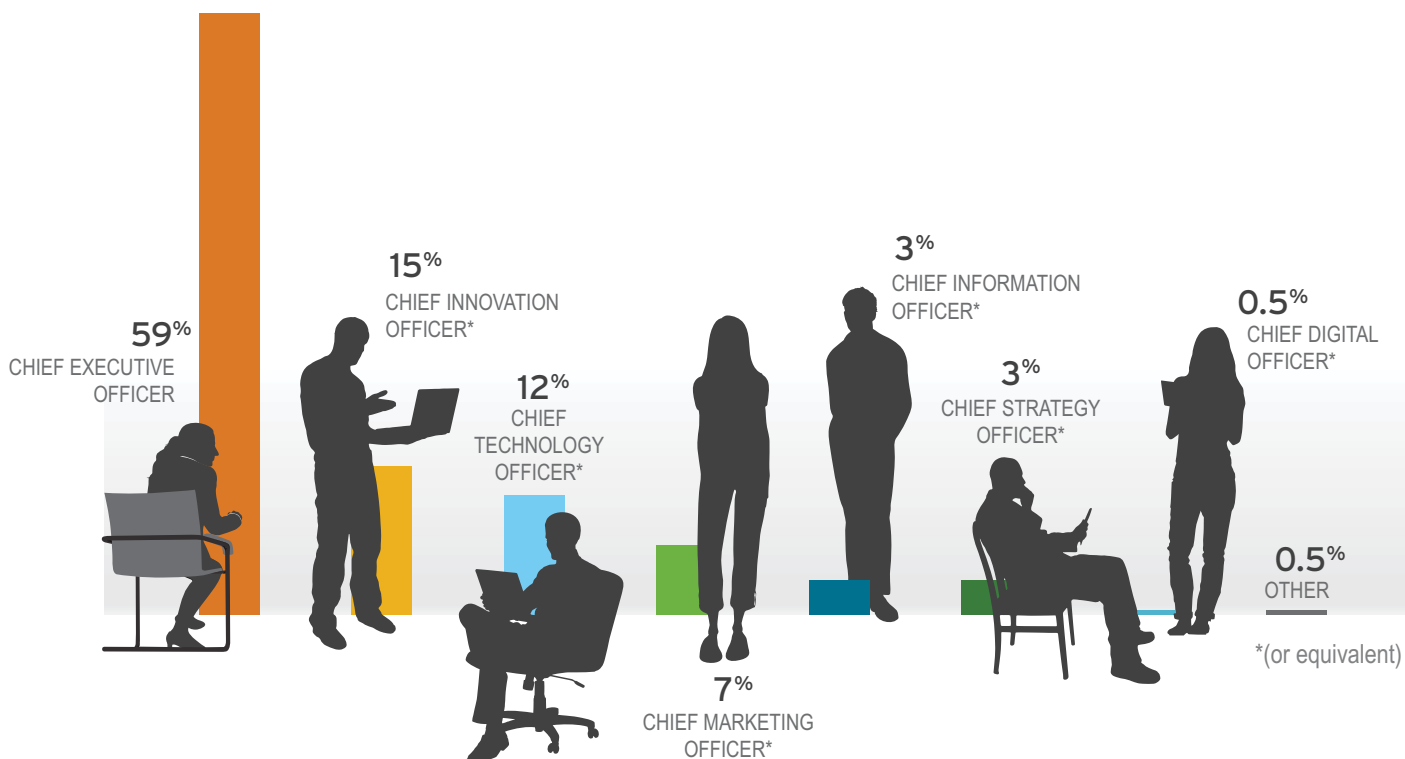
Navigating the Next 10 Years of Market Uncertainty

Long-term opportunities lie in the complex set of interdependencies found within the smart product ecosystem, as products move from design to manufacture and into the hands of users. Expect the technology interactions between suppliers, manufacturers and the channels that serve customers to accelerate as smart products connect together through autonomous workflows. The economics of a smart product strategy may be uncertain over the short-term, but shifting market dynamics have caught the attention of the CEO, who in many cases is leading the smart product drive (see Figure 8). Leaders need to plan for a period of profound change and uncertainty, and lay the groundwork for a potentially huge opportunity.

Expect the technology interactions between suppliers, manufacturers and the channels that serve customers to accelerate as smart products connect together through autonomous workflows.

A High-Stakes Gambit

Who among the C-suite owns the smart product strategy?



Response base: 205 (multiple responses permitted)

Source: Cognizant/EIU study

Figure 8

We believe that three broad phases will shape this crucial time period, which we predict will span at least 10 years. First, smart products will get gradually smarter, followed by a period of hyper-competition and then a phase of industry realignment around consortia (see Figure 9). Each phase will require careful planning and readjustment to market realities. In the end, we believe market success will require an intensive ecosystem approach toward product innovation and service delivery, as well as a sophisticated approach to partnering.

Phase 1: Newly Smart Products Trigger Experimentation

In this first experimental phase of smart product disruption, physical products gain virtual identities. Investment is needed for market research and co-creation initiatives to ensure that the voice of the customer is loud and clear, prohibiting product options to be added that customers don't value. Product and service innovation focuses on installing smart components that make products smart – and smarter – as well as building the digital interface that controls and tracks interactions.

Investment is needed for market research and co-creation initiatives to ensure that the voice of the customer is loud and clear, prohibiting product options to be added that customers don't value.

The product development process will improve in this phase as data starts to flow into and around the business. The R&D, production, marketing and customer service functions gain new insight into how customers use (and want to use) products, as well as the interactions between sets of products and processes. Analytics identifies the meaningful connections and correlations between the different conditions involved in a product's manufacture, sale and customer experience.

How the Smart Product Space Will Play Out Over the Next Decade

Phase 1: Product Alchemy

- Physical products gain a virtual identity.
- Co-creation moves customers upfront, into the product development process.
- Product data starts to flow in and around the product ecosystem.
- Analytics enriches processes that touch the product (R&D, production, marketing, sales).
- Business model experimentation starts as revenue, pricing and channels adapt to smart products.

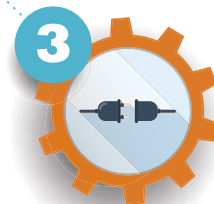


Phase 2: Data Mastery Dominates

- Software and technology prowess drives mastery of data and determines the product experience.
- Product functions and data feeds start to optimize one another.
- Competition intensifies and focuses on the product experience.
- Success depends on how effectively a company and its partners use and share product data.
- The interoperable “product cloud” emerges to underpin the technology.

Phase 3: The Era of Consortia

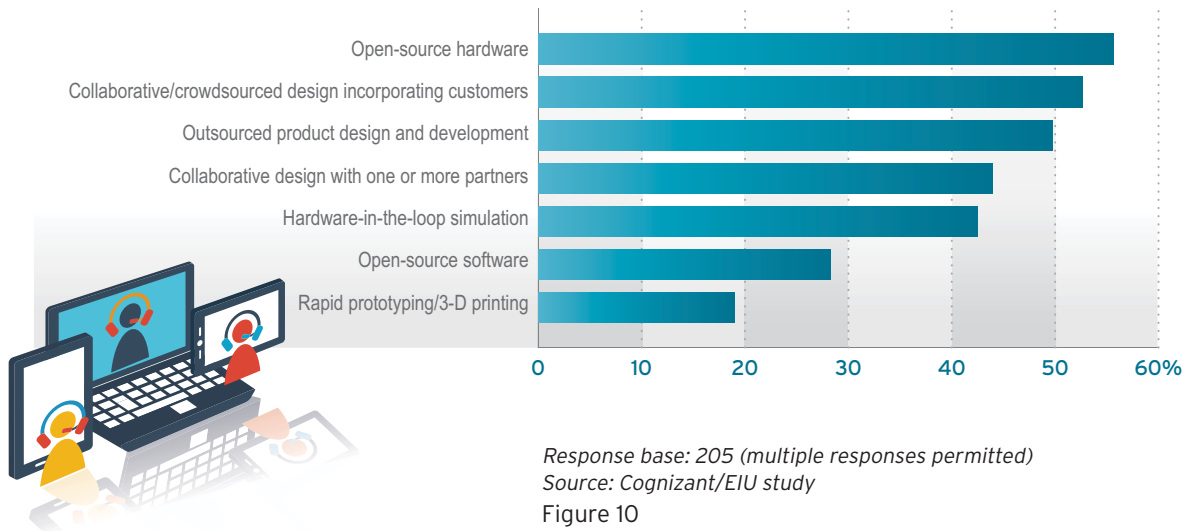
- An interconnected product economy emerges.
- Products integrate as companies co-opt product data and co-invest in product development.
- Consortia compete to see which can offer the best set of integrated services.
- Clarity grows around the business model.
- New finance and collaboration models unlock the smart product opportunity.



Source: Cognizant
Figure 9

Transparency & Collaboration Rule

Which tools and techniques have you applied during smart product development?



Meanwhile, business model changes – such as subscription-style services, new pricing models, delivery channels and partnerships – will impact revenue flow.

This first phase also involves engaging with users and customers. Our survey reveals that companies are deploying co-creation techniques and open-source platforms to move the customer to center stage (see Figure 10). These techniques support analysis based on each customer segment, which enables companies to predict how smart products will impact the business model.

To successfully navigate this phase, we recommend:

- **Creating a space to “forge” a smart product play.** If you don't already have a “digital lab” to undertake R&D related to smart products, consider building one. In these spaces, product stakeholders can come together and explore the key business implications of making a product smart. Building powerful customer behavior models will help decode the business possibilities and potential impact on traditional business.
- **Infuse “co-creation” approaches into product development.** Co-creation processes deploy crowdsourcing techniques and/or open collaboration platforms to drive a product improvement or innovation. Techniques like open-source hardware¹⁹ (initially used in electronics) offer public source files for physical products (mostly digital design files) that are freely available to anyone to study, modify, distribute or deploy in a product.

Phase 2: Data Mastery Powers an Era of Hyper-Competition

During the second phase, a period of hyper-competition ensues. Business rivalries intensify, and customers are inundated with new product ideas and improvements. Competitors jockey to offer the best digital experience, the best set of products or the best engagement model. One strategic objective noted by many respondents is the use of product data to nurture a direct relationship with customers; we expect all players (across channels, manufacturers and suppliers) to make similar entreaties.

Software is integral to the product experience, and the most competitive companies will be those that can most effectively use and share product data.

In this stage, the focus shifts toward the product experience. That experience – and in many cases, the brand experience – grows around the use of proprietary data and how well one company can bind its data with one or more third-party sources. Product functions (and data feeds) begin to synchronize with one another. This phase of the market's evolution is predicated on competitive differentiation created by how well a company or consortia integrates and applies product data.

Software is integral to the product experience, and the most competitive companies will be those that can most effectively use and share product data. Moreover, data sharing becomes automated, as application programming interfaces (APIs) emerge around the product's ecosystem. The ability of algorithms to identify an opportunity or recalibrate a process, or a set of intercompany processes, places data mastery at a premium.

Software and technology are vitally important in this phase. The design of the product interface, foundational tools, product platforms, applications and service layers requires targeted technology investments. As a result, we recommend:

- **Conceptualizing the “product cloud.”** Each product will have its own virtual identity, which should be built around the concept of a “product cloud.” The product cloud holds the data and intelligence about a product's interactions and supports third-party collaboration. Consider how much intelligence to embed in the product's software (expensive) vs. how much to embed in the surrounding product cloud (cheaper). Make your product cloud integrate with others through open architectures and shared APIs.
- **Ensure a flexible architecture.** The product cloud will change as more contextual information or third-party data is added. Ensure that the supporting architecture is flexible enough to evolve for scale and added security. The architecture must extend into the databases that store the product's interactions; the new analytics systems and processes to make meaning from proprietary and third-party data; and a service layer to enable products and consortia to tightly integrate.

New corporate structures emerge to reduce the risks of working collaboratively, and partnership models evolve to reduce development costs, access external capacity, and share risk and reward.

Phase 3: Partnering Primes an Era of Consortia

We see an interconnected product economy emerging in this third and final phase of the market's development. Products become intertwined as companies combine product data and co-invest in smart product development.

New corporate structures emerge to reduce the risks of working collaboratively, and partnership models evolve to reduce development costs, access external capacity, and share risk and reward. This phase will be dominated by consortia competition as market participants vie to offer the best set of integrated services to capture customer spending or spot new market opportunity.

Clarity around the business model and a fluid, software-driven interface is a given. The interface (or app) offers customers a powerful and simple service; an example from the utility space would be, “Press here to switch on your heating 20 minutes before you arrive home and switch off the alarm.”²⁰ Competition shifts from a single

“Lean into” a product ecosystem to gain insights into how a process can be made more effective. Seek third-party data feeds that can offer insight and meaning into how customers use your products.

product’s functionality, to the performance of an entire system – the home, the car, etc. – in which one product or service meshes seamlessly with others through an integrated platform.

New finance and collaboration models will unlock vast opportunities during this final market development phase. Funding a venture unit with lab, scientific resources and management infrastructure is a huge commitment. However, organizations can reset their supplier relationships to reduce the resource commitments that smart product development demands. To do so, we recommend:

- **Starting the process of combining data.** Respondents said they are actively combining data to jumpstart the development of smart products. Start by making digital design files freely available for third parties to study and modify. “Lean into” a product ecosystem to gain insights into how a process can be made more effective. Seek third-party data feeds that can offer insight and meaning into how customers use your products.
- **Finding new models that share risk and reward.** New partnership models and organizational structures will help with this. Align investment with the degree of resources and overall operating control required. The proportions may change, depending on the competition for a product or its user base (i.e., the higher the perceived desirability, the greater risk and cost a company is willing to assume).

Source the Right Talent at the Right Time

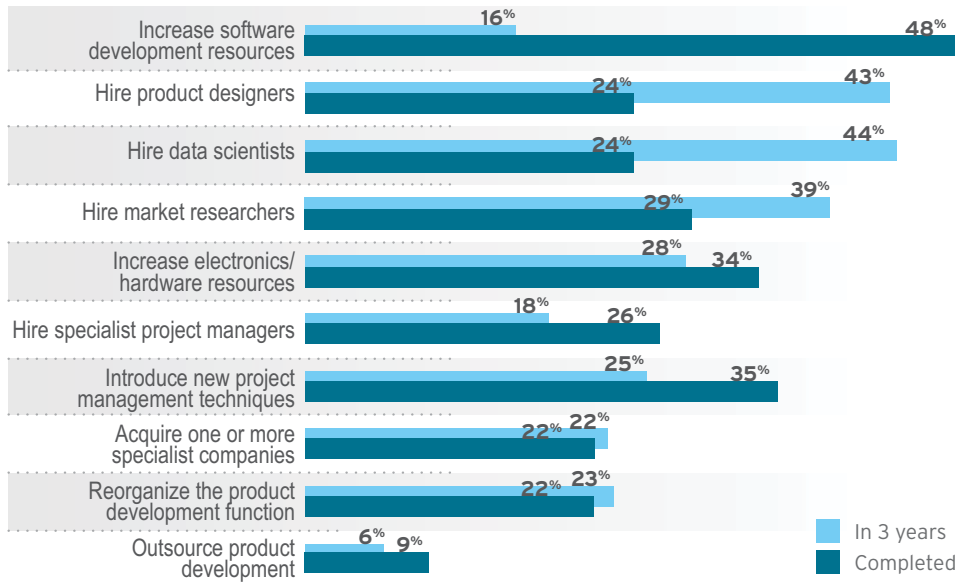
The talent needed to succeed with smart products should be calibrated to each phase of the market. Our findings suggest that the current need for talent reflects first-phase requirements. However, the deluge of data that smart products are generating foreshadows where skill gaps will lie. So, while short-term technical requirements (adding sensors, instrumentation, Bluetooth protocols, etc.) are relatively easy to accomplish, the longer term calls for a talent bank of product designers, data scientists, market researchers and business specialists.

Figure 11 (next page) reveals that the top two capabilities sought by respondents are product designers and data scientists. Huge volumes and varieties of fast-growing product data needs to be properly captured, visualized and analyzed to inform new product design. Specialists are needed to visualize and build the customer experience or convey the story of what product data means to a business. Market research commands a premium, as a lack of business model clarity dominates the first phase of the market. Financial and business modeling skills are needed to predict how a smart product strategy will impact cost and revenue flows, as well as to strike the innovative collaboration and financing approaches that smart product strategies will require for the longer term.

Financial and business modeling skills are needed to predict how a smart product strategy will impact cost and revenue flows, as well as to strike the innovative collaboration and financing approaches that smart product strategies will require for the longer term.

Sourcing Talent: Right Place, Right Time

What adaptations will you make in order to pursue your smart product strategy?



Response base: 205 (multiple responses permitted)

Source: Cognizant/EIU study

Figure 11

Looking Ahead: Building a Product Model for the 21st Century

The vast IP product infrastructure that is currently being built allows companies to add intelligence to almost any object or device, watch it and learn from it. The sensors and processors, software controls and data storage embedded in a product or around it, and accessed through a digital interface (like a dashboard or an app), enable product data to be shared and applied to strategic business decisions.

By examining a product's data and using analytics systems and processes, manufacturers can see and predict a product's behavior – and the wants and needs of its user. This insight will fundamentally change the customer relationship, the product design and the business model underpinning it. We believe that entirely new product ecosystems will emerge for the digital age, and industry leadership will hinge on data mastery. As such, companies that wish to lead and capture the opportunity of smart product strategies must consider the following:

- **Identify a smart product initiative and focus.** We found some companies are already using smart products to improve a manufacturing process, develop an innovative product or service, or enrich the customer experience. We suggest selecting one initiative that will drive a smart product strategy forward. The short-term technical aspects of making a product smart are relatively easy to accomplish and source. Making meaning from product data, however, requires new types of skills that are externally sourced or built and redeployed from within the organization.

- **Engage customers at the start of the journey.** The initial moves toward smart products require experimenting and engaging with a wider set of players in a product ecosystem. Customer insight will ensure that your organization adds features and capabilities that are highly desirable, which will encourage more interaction and thus more data. Consider building a physical infrastructure for doing this effectively, such as a digital lab (or sharing with a partner that has one). Doing so will help ideate with stakeholders and showcase the art of the possible. Building a robust customer scenario model can help forecast the long-term impacts for the business model.
- **Develop the mindset to experiment.** Data from a newly-smart product offers insight into how a customer uses, or wishes to use, a product. However, product data also offers a myriad of other beneficial uses, from automating customer service and running a product lifecycle analysis, through creating a platform to combine and share insights with third-party suppliers for joint go-to-market approaches. Winning companies will use proprietary and third-party product data to experiment and develop innovation streams and enriched customer experiences.
- **Recalibrate processes and the business model.** Business leaders must come to grips with how their companies focus, specialize, manufacture and collaborate with customers, partners and competitors in an era of smart products. We predict that a winning smart products model will feature “co-opetition” on steroids, as technology and go-to-market interactions accelerate when multiple providers make up a product ecosystem.²¹ The business model is in a state of change: As customer insights emerge, revenue, pricing and channel models must adapt to large-scale adoption of smart products.
- **Start the process of striking new, innovative partnership approaches.** Look to develop new corporate structures that reduce the risk of working collaboratively. New partnership models will evolve to reduce development costs, access external capacity and share the risk and reward from integrated product development. Success in the smart product arena will be achieved by companies that offer the best set of integrated services to capture customer spending or spot a new market opportunity. Mastery of proprietary and third-party data truly counts.

Afterword

Success with smart products means integrating the explosion of product data into the monolithic 20th century industrial model. Leaders will face a nerve-wracking set of challenges as they navigate the next 10 years and forge a new business model with data mastery at its core.

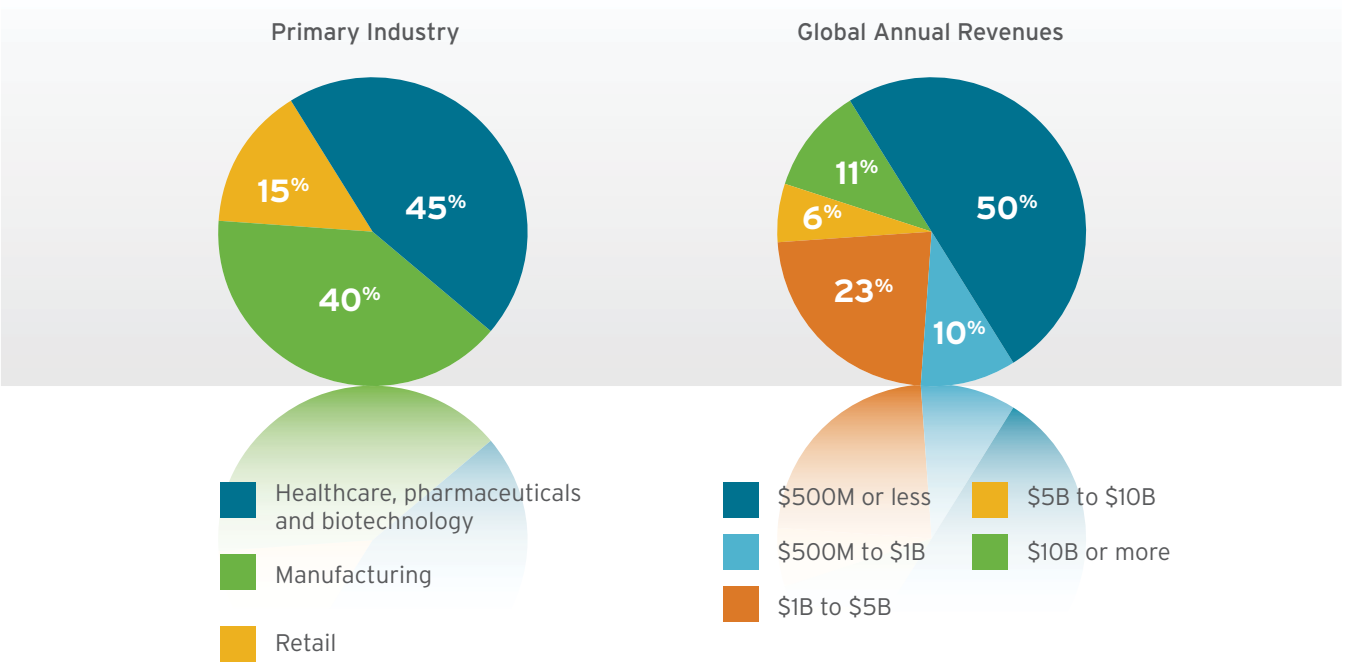
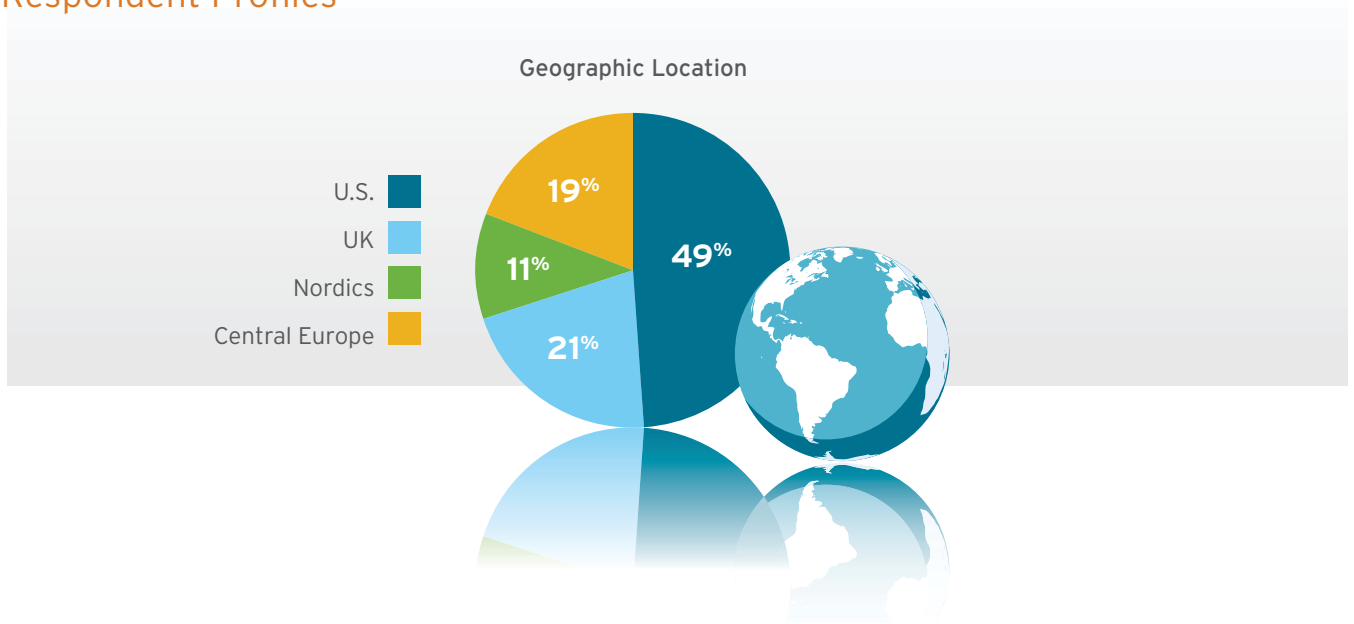
Moving too slowly would be catastrophic. The ability to listen closely to the customer – or partner with someone that can – will fuel seemingly endless and unforeseen value creation as the blending of a product’s physical characteristics with its virtual capabilities becomes the rule rather than the exception. This is digital disruption writ large.

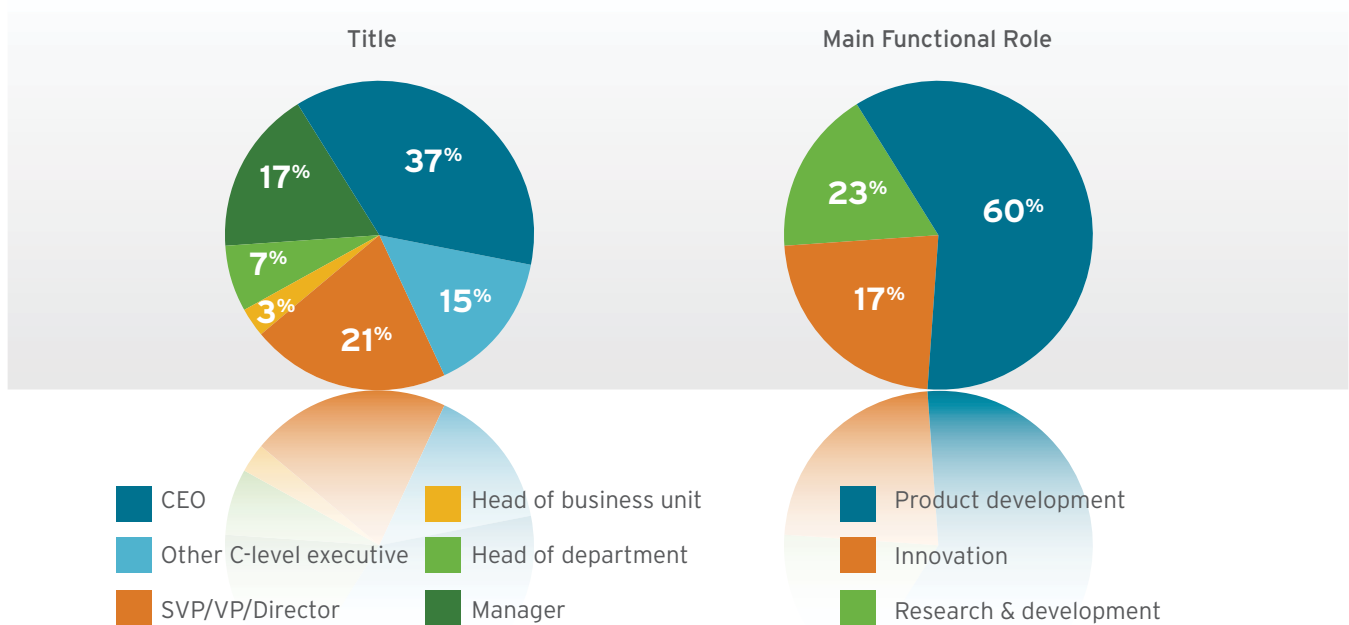
Appendix: Study Methodology

We sponsored the EIU to survey 205 R&D, product design and innovation executives from companies in the healthcare, retail and manufacturing sectors that are involved with developing smart products. We also engaged several senior CEOs from these sectors. Of those companies, 74% said they have already successfully developed such products.

All quotes in this report were collected as part of the executive interviews accompanying the survey.

Respondent Profiles





Footnotes

- ¹ Bruce Horovitz, "Diageo's 'Smart' Johnnie Walker Bottle," *USA Today*, Feb. 26, 2015, <http://www.usatoday.com/story/money/2015/02/25/diageo-johnnie-walker-smart-bottle-digital-marketing/24010291/>.
- ² Estimates vary on the number of interconnected devices and products, but Nokia's numbers have been widely quoted. See "Nokia Networks to Power Internet of Things with 5G Connectivity and Network Security," Nokia, Feb. 19, 2015, <http://company.nokia.com/en/news/press-releases/2015/02/19/nokia-networks-to-power-internet-of-things-with-5g-connectivity-and-network-security-mwc15>.
- ³ GE's smart wind turbine uses remote sensors to share data with service technicians and other turbines on blade pitch, wind speed, wind direction, output and grid conditions. With this information, problems can be found and diagnosed more quickly, decreasing disruptions to the wind farm. For more information, see: <http://www.renewableenergyworld.com/rea/news/article/2013/04/ges-new-brilliant-wind-turbine-put-to-the-test>.
- ⁴ The Oral B Smartseries 7000 is just one of a new type of Bluetooth-enabled toothbrush. This model syncs with a mobile app that tracks and monitors your style of brushing, provides dentist-inspired feedback in real-time and charts your brushing behavior on a graph. For more information see: <http://www.oralbnordic.com/en-SE/product-detail/new-black-oral-b-pro-7000-smartseries-with-bluetooth>.
- ⁵ The Babolat Play Pure Drive racket uses sensors integrated into the handle to record and store information about the player's actual performance, including power, impact location, type and number of strokes (forehand, backhand, serve, overhead smash, etc.). The data can be sent via Bluetooth to a mobile app that charts, analyzes and compares progress against goals. Users can also choose to post their performance data on social media or challenge friends to a side-by-side stats battle. For more information, see: <http://www.babolat.com/product/tennis/racket/babolat-play-pure-drive-102188>.

- ⁶ Using Disney's Magic Band, visitors can store their park passes, unlock their Disney Resort hotel room and buy food and merchandise. Additionally, the FastPass+ functionality allows them to access all the plans and vacation choices they've selected online. For more information, see: <https://disneyworld.disney.go.com/plan/my-disney-experience/bands-cards/>.
- ⁷ Intelligent or smart packaging usually involves the ability to sense or measure an attribute of the product, the inner atmosphere of the package or the shipping environment. This information can be communicated to users or can trigger active packaging functions. Smart packaging helps extend shelf life, monitor freshness, display information on quality, improve safety and improve convenience.
- ⁸ There's been a startling wave of innovation in electronic hardware, with game-changing performance in sensors and batteries. The smartphones we carry demonstrate the rapid miniaturization of sensors and the energy efficiency of batteries. Marry that efficiency to incredibly compact, low-cost computer processing power and storage costs, which now make it possible to put cheap, highly powerful computing power inside a product.
- ⁹ While car tracking programs may feel intrusive, car insurance companies already collect personal data that has nothing to do with driving. To calculate risk – and your premiums – insurers consider things such as age, gender, marital status, and income and education level. Usage-based insurance is just the latest frontier in insurance companies' quest to accurately predict risk. When you sign up, a small device is plugged into your car's diagnostics port to track driving habits. The tracking device collects data on things such as miles or kilometers driven, acceleration, braking (including "hard-braking" incidents), speed and time of day the vehicle is driven. For more, see "How Car Tracking Programs Are Changing Auto Insurance," Compare.com, Sept. 15, 2014, <http://www.compare.com/auto-insurance/guides/how-insurance-telematics-work.aspx>.
- ¹⁰ For more on Code Halos, see our book, *Code Halos: How the Digital Lives of People, Things, and Organizations are Changing the Rules of Business*, by Malcolm Frank, Paul Roehrig and Ben Pring, John Wiley & Sons, 2014, or our white paper, "Code Rules: A Playbook for Managing at the Crossroads," Cognizant Technology Solutions, June 2013, <http://www.cognizant.com/Futureofwork/Documents/code-rules.pdf>.
- ¹¹ As the digital revolution has gathered momentum, it has become widely understood that the "digital customer experience" is the key to engage with, delight and monetize customers in the modern world. However, only a miniscule number of U.S. and European companies believe their customers' current digital experience could be qualified as "excellent." In an era when the majority of organizations believe their brand is software (and software is their brand), companies are making a shocking admission that requires urgent attention: The digital experience that they offer to customers isn't so great. See the report from Cognizant's Center for the Future of Work and Oxford Economics, "Putting the Experience in Digital Customer Experience," November 2014, <http://www.cognizant.com/InsightsWhitepapers/putting-the-experience-in-digital-customer-experience-codex1180.pdf>.
- ¹² Cognizant launched a Co-Creation Center in Sweden to offer insight into how firms collaborate and accelerate innovation. The center offers a compelling vision into how firms innovate, manage and monetize across customers, suppliers and employees, from integrating the voice of the customer into new product or service development, to managing the process of innovation through the business. For more information, see "Co-Creation Center Visits ISS in Denmark," *The Cognizant*, Jan. 31, 2014, <http://www.thecognizant.com/2014/01/31/co-creation-center-visits-iss-denmark/>.
- ¹³ "Putting the Experience in Digital Customer Experience," Cognizant Technology Solutions and Oxford Economics, November 2014, <http://www.cognizant.com/InsightsWhitepapers/putting-the-experience-in-digital-customer-experience-codex1180.pdf>.

- ¹⁴ The “give to get” equation is detailed in our book *Code Halos*, Chapter 9, page 133.
- ¹⁵ David Rose, an MIT Media Lab scientist, imagines how everyday objects can intuit our needs and improve our lives. See *Enchanted Objects: Design, Human Desire, and the Internet of Things*, Scribner, July 2014, <http://www.amazon.com/Enchanted-Objects-Design-Desire-Internet-ebook/dp/B00DPM7W02>.
- ¹⁶ Samuel Gibbs, “The Battle for the Car: Will Google, Apple or Microsoft Dominate,” *The Guardian*, March 6, 2014, <http://www.theguardian.com/technology/2014/mar/06/battle-for-car-will-google-apple-microsoft-dominate>.
- ¹⁷ The connected home is a networked home to which multiple services are delivered, including entertainment, education, home automation, security, healthcare, government services and control of energy use. Rather than an aggregation of disparate services, delivery of these services needs to be enabled by a fully integrated platform. For more information, see “The Connected Home: A Reality,” *Intellect*, December 2011, <http://www.techuk.org/connectedhome/>.
- ¹⁸ We asked respondents about their most difficult operational challenges in developing a smart product strategy. Pricing was the most challenging, alongside the technology implications from product data. For information on the questionnaire and data set, see the study methodology on page 20.
- ¹⁹ “Open-source hardware” is hardware whose design is made publicly available so that anyone can study, modify, distribute, make and sell the design or hardware based on that design. The hardware’s source and the design from which it is made are available in the preferred format for making modifications to it. For more information, see OSHW, <http://freedomdefined.org/OSHW>.
- ²⁰ For example, a UK utility provider offers a three-piece kit that enables customers to control their heating remotely. The kit includes a thermostat, router hub and IP receiver, with an app as the digital interface. For more information, see <http://www.britishgas.co.uk/products-and-services/hive-active-heating.html>.
- ²¹ Novell founder Ray Noorda coined the term “co-opetition” in 1992 to reflect the technology industry’s then-novel move by companies to simultaneously partner and compete with one another. For more information, see <http://en.wikipedia.org/wiki/Coopetition>.

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