ptc

arena

How IoT Is Changing the Face of Innovation

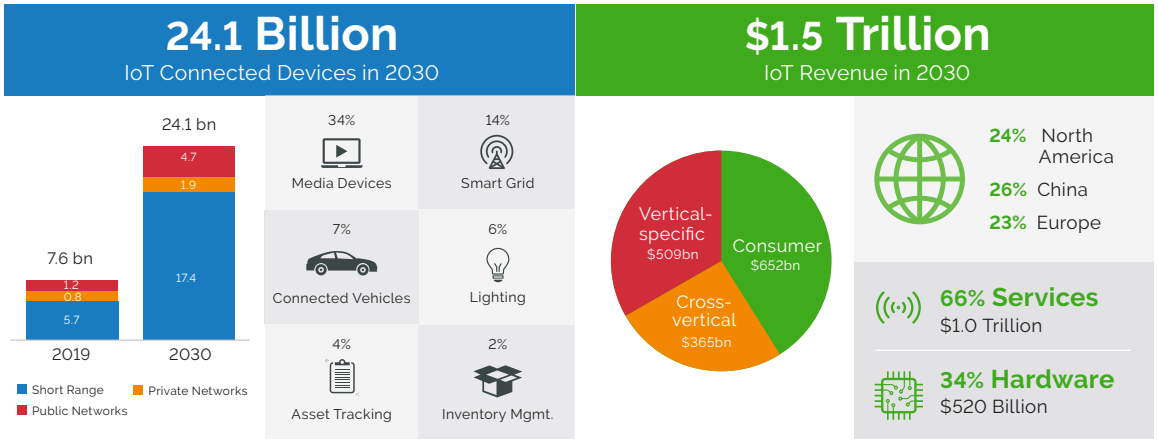
Connected Device Manufacturing Requires Controlled and Collaborative Product Development

WHITE PAPER

THE INTERNET OF THINGS IS ACCELERATING PRODUCT INNOVATION

The pace of introducing Internet of Things (IoT) products and capabilities has been increasing rapidly. More and more companies are looking for new ways to connect devices, data, and people to provide valuable insights to consumers and manufacturers alike. IoT devices are internet-connected devices that send and acquire data from surrounding environments using sensors and other types of communication. There are a variety of predictions about the growth of IoT devices and revenue. Transforma Insights estimates that the number of IoT devices will grow to 24.1 billion by 2030. And revenue will increase to $1.5 trillion by 2030.[1]

The Internet of Things (IoT) Market 2019-2030



The proliferation of IoT devices spans consumer electronics, automotive, medical devices, and many other types of products. Household appliances, drones, and cars are among some of the most popular types of devices that can communicate with, and about, customers and their usage habits or behaviors. The manufacturing industry also leverages Industrial Internet of Things (IIoT) to help analyze and drive improvements with efficiency of equipment and manufacturing processes.

The underpinnings of IoT devices include sensors, software, and electronics. This results in more sophisticated designs and products that require seamless interoperability to work well. When you consider the thousands of components and electronics that make up any given product—and the complex distributed supply chains required to source and build those—it's not hard to see how communication mistakes can occur as engineering, quality, procurement, manufacturing, and suppliers try to design, test, build, and deliver new products across states, countries, or continents.

As the volume of new IoT development increases, product launch failure rates for these products have increased to close to 75% according to Deloitte and Cisco.[2] This puts hundreds of billions of dollars at risk for electronics manufacturers. With such high failure rates, companies that develop IoT products should consider these key questions:

- How can you manage your design and development processes or products better?
- Where can you use IoT for remote operation and management of assets and data?
- How can you extend the value of existing products with the IoT?
- What product development solutions will help you design and deliver high-quality products ahead of your competitors?
- How can you increase visibility to all internal teams and suppliers to collaborate fast and effectively?

In this Arena white paper, we explore how IoT is changing the face of innovation and product development.

WHY YOU SHOULD CARE ABOUT IoT

The Internet of Things is a product design megatrend that is impacting how both new and old companies innovate and turn designs into the next breakthrough.

As product designers dream up countless ways to leverage the connected smart products, complementary technologies like artificial intelligence (AI), augmented reality (AR), autonomous driving, and robotics will come together to drive better ways to live, travel, and improve our health and daily lives.

> From virtual reality to self-driving cars to wearable devices, the opportunities are endless. We are entering a quantified world, so hold on to your IoT 'hat.'
>
> —Michael Keer, CEO, Product Realization Group

The use of sensors, electronics, and software will be applied to virtually every product and problem that we can think of. The solutions, or products, may not always solve a problem that appeals to the masses—but those products that do will drive consumer expectations for many years to come.

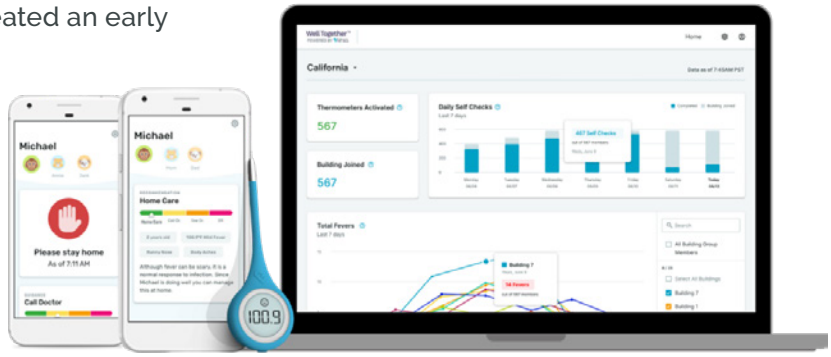
Michael Keer, CEO of Product Realization Group (PRG), a consortium of Silicon Valley experts that helps bring IoT product companies to market, believes the IoT market will impact every aspect of our lives, and transform how we interact with both physical and digital worlds. "From virtual reality to self-driving cars to wearable devices, the opportunities are endless," says Keer. "We are entering a quantified world, so hold on to your IoT 'hat.'"

In the next wave of IoT development, we'll see the aggregation of connected devices propagated into truly smart homes, smart factories, smart grids, and smart cities.

New IoT products introduced at the Consumer Electronics Show (CES) offer imaginative solutions, ranging from do-everything wearable devices to connected tennis rackets that record your strokes. Some products will drive less critical healthcare improvements—such as smart toothbrushes that record your brushing activity and make recommendations when your teeth need to be thoroughly cleaned. Other healthcare solutions will address more serious medical needs like diabetes, heart ailments, and more.

IMPROVING HEALTHCARE WITH CONNECTED MEDICAL DEVICES

With advances in IoT and medical device technology, the ability to offer remote and continuous monitoring of a patient's health will play a larger role in the diagnosis and treatment of many ailments. Pandemics like COVID-19 have already shown the value of having connected devices, like smart thermometers provided by Kinsa® to track and predict outbreaks.

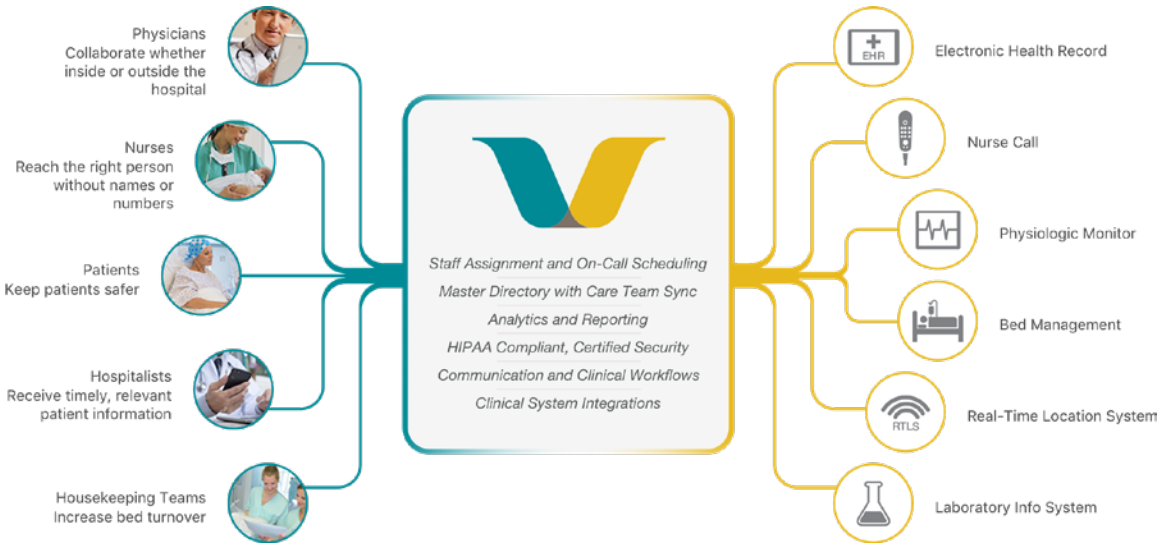


Kinsa is one company that created an early warning system from their network of connected thermometers to help public health officials identify where outbreaks of influenza-like illness (ILI) are occurring. This system has shown it can predict and alert communities of an ILI outbreak far earlier than the CDC and, recently, Kinsa's detection of atypical illness has shown a strong correlation to outbreaks of COVID-19.[3]

Connected medical devices can also be used to track lifestyle diseases such as hypertension, diabetes, and asthma, which need continuous monitoring. Companies like Vocera® are leading the way by providing smart communication devices for healthcare workers and those on the front lines.[4]

Optimize Patient Safety Through Real-Time Decision-Making and Instant Communication

The Vocera platform is the intelligent ecosystem that connects all the people and information needed to deliver patient care.



Medical device manufacturing innovators deal with a myriad of obstacles to commercialize and sell products in the U.S. and other countries around the world. The need to manage the design, development, quality, and approval processes is critical to gain FDA approval or comply with ISO regulations like 13485. Arena helps medical device companies move from early research and development to product launch with cloud-based quality management system (QMS) solutions built for today's sophisticated device designs and distributed teams.

Arena QMS helps medical device manufacturers speed product development with a single system for the product record and associated quality and compliance records. Taking a product-centric approach, Arena helps companies manage quality processes in context to the full product record, which includes assemblies or bills of materials (BOMs), design history files (DHFs), and device master records (DMRs). As companies increase the number of sensors, electronics, and software used in their IoT devices, Arena makes it easy to keep all design, development, quality, and compliance information in a single controlled system that provides maximum traceability throughout the product development process.

HOW CLOUD PRODUCT DEVELOPMENT HELPS

While pain points, regulatory hurdles, and adoption rates can vary widely across industries, one challenge that impacts every IoT company is the critical need to speed the introduction of safe, high-quality products. To ensure first-mover advantage in highly competitive industries, more companies rely on a cloud-based product lifecycle management (PLM) or QMS solution to design, develop, test, and ship products on time.

The key to speeding development is having a cloud system that acts as a single source of truth for all internal teams and external supply chain partners. Cloud systems provide faster deployments and highly secure platforms that can be set up quickly and used intuitively with minimal training. That is critical for supply chain partners that dot the earth and have limited resources to learn new tools. "What I see most often with IoT customers is that they want to get up and running quickly with basic functionality," says Keer. "It's part of the lean startup mentality. And as these companies grow in size and complexity,

they need solutions with the capabilities to support them as they scale—without the need to switch during a critical business ramp. The vast majority of companies do not want to be burdened with the installation, setup, and IT maintenance of on-premises software solutions."

The speed of disruption is so fast in the IoT space, engineering teams must be rock solid in their delivery. Many failed IoT companies were unable to meet aggressive design and delivery schedules because they did not have the proper systems in place to manage product design and quality information.

Manny Marcano, president and CEO of EMA Design Automation, a company that offers a design automation solution for Cadence® OrCAD™, explains that "A lot of these companies are charging fast to grab a piece of the IoT market. And a lot of times they're starting with a back-of-the-napkin design and quick prototypes to get VC funding and then they're off to the races," says Marcano. "Companies in the IoT space are actually rolling out PLM at the same time they are building products and taking orders. So, if you have a design solution that can be implemented quickly—without a lot of overhead to get a consumer electronics stamp and FCC approval—that's a big value to them."

For OEMs, the key to moving fast in the rapidly changing IoT market is maintaining rigor, discipline, and forward-looking strategies. Successful companies keep abreast of tech developments and make well-researched judgment calls about how and when to pull the trigger and adopt new innovations into a product design. However, companies without the vision and tools to respond to change and adopt new technologies quickly could lose the razor's edge in this competitive high-tech market.

Innovation is the holy grail of many product companies as they seek to differentiate their products from those of competitors. Connecting product and quality processes throughout the product lifecycle gives today's global companies the competitive edge they need.

TURNING RAPID CHANGES INTO IoT DEVELOPMENT ADVANTAGES

Change happens fast and manufacturers must react quickly and embrace new technologies and practices to succeed. Ensuring distributed teams can work seamlessly together on the latest designs helps companies get products to market faster and with fewer quality issues. Minimizing costly product design errors or shipping delays can be the difference between capturing new markets or going out of business.

"Some of the biggest disruptions in IoT products are changes in electronic components. Sensors, controllers, and batteries are all rapidly evolving to better support new applications like wearables that need smaller and lower-power-consuming parts," says Keer. "After all, you wouldn't want to buy a smartwatch that weighs 10 pounds and runs out of juice in four hours."

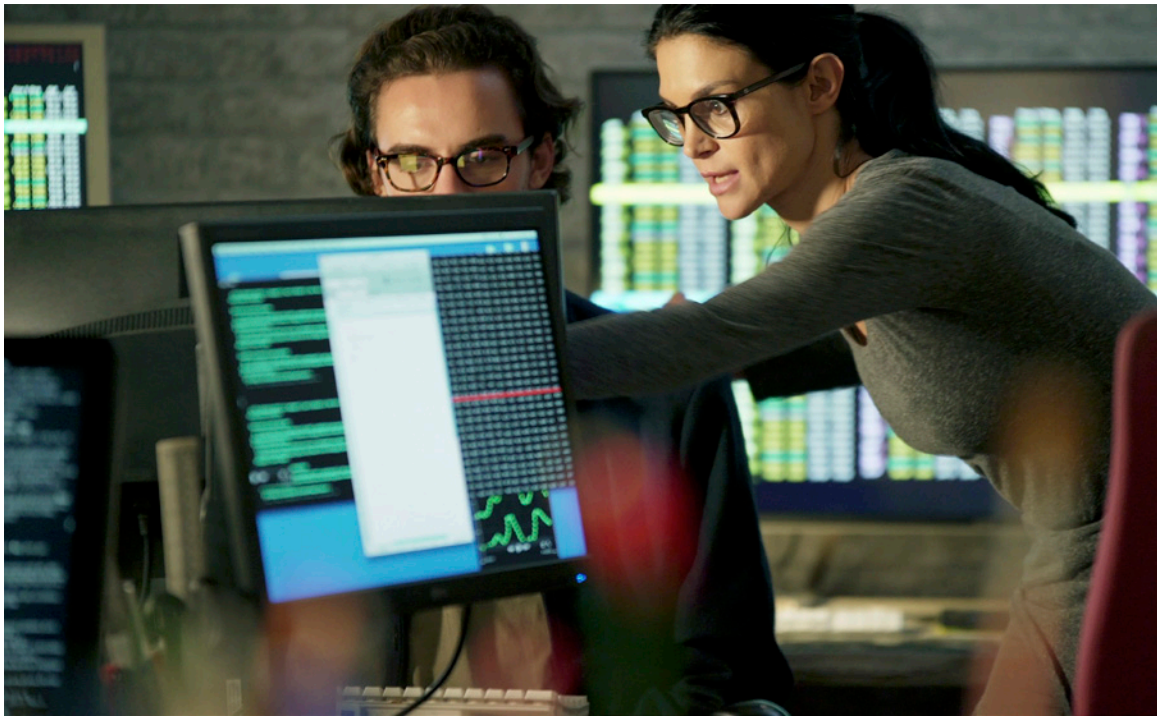
Cloud PLM and QMS solutions help manufacturers and their supply chains gain greater visibility and flexibility to pivot and make changes quickly as designs evolve or quality issues arise.

According to Keer, a cloud-based solution is critical to keep track of the entire product design including sensors, software, and electronic components. A better understanding of which parts are going obsolete can provide a competitive edge for IoT companies. A strong product development system enables companies to better identify, source, and procure components.

> Some of the biggest disruptions in IoT products are changes in electronic components. Sensors, controllers, and batteries are all rapidly evolving to better support new applications like wearables that need smaller and lower-power-consuming parts. After all, you wouldn't want to buy a smartwatch that weighs 10 pounds and runs out of juice in four hours.
>
> —Michael Keer, CEO, Product Realization Group

"As engineers identify and document approved components, operations can add those components into Arena. They can figure out lead time for each component, determine if it's compliant to environment regulations, and speed the time to market," says Keer.

Companies struggling to keep up with the rapid pace of technological advances like IoT need systems that bring teams and information together quickly, so decisions can be made to improve or resolve design issues. Manual or document-based approaches using spreadsheets, point solutions, and email won't scale because they don't provide a single source for all product and quality collaboration—especially with teams that are dispersed.



COLLABORATIVE, CONNECTED DEVICE MANUFACTURING

The best way to manage the sophisticated product development for IoT devices is through a holistic approach that brings the entire product and quality record together into a single system. When design, testing, development, quality, and compliance are managed together, it dramatically reduces product mistakes and supply chain manufacturing issues.

IoT-connected smart devices are changing the way we live. Manufacturers that struggle to keep up with technological advances will have a difficult time meeting consumer requirements and demand. The best way to ensure companies can develop and launch high-quality solutions is to have a single cloud solution that brings everyone together and keeps them on the same page throughout product development and new product introduction.

Arena invented Cloud PLM and has extended solutions to QMS to address the needs of high-tech, consumer electronics, medical device, and biotechnology companies. The new product innovation paradigm requires today's innovators to move from single products to connected platforms. So, whether you are just beginning to introduce IoT solutions or striving to expand your connected, smart products further—consider what over 1,400 global companies already know. They trust and rely on Arena to streamline their product development processes and deliver great products on time.

REFERENCES

1. https://iotbusinessnews.com/2020/05/20/03177-the-iot-in-2030-24-billion-connected-things-generating-1-5-trillion/
2. http://www.scdigest.com/ontarget/18-07-18-1.php?cid=14462&ctype=content
3. https://kinsahealth.com/research
4. https://www.vocera.com/products/vocera-communication-platform

ptc arena