

Business Strategy Is Being Transformed for the Digital Revolution



As the Digital Revolution sweeps through the business landscape, it is disrupting companies that were built to thrive in the Mass Production era. The examples are both plentiful and painfully familiar:

- Kodak continued to focus on its film business even as the digital camera tsunami was washing away its profits. The company missed the fact that users were printing fewer photos and instead sharing them online.¹
- Blockbuster stubbornly refused to shift its business model away from DVDs rented in physical stores located on expensive real estate, ignoring the trend toward users streaming movies in their homes and on their mobile devices.

- Travel agencies were unable to survive as on-line services like Expedia, Price Line and CheapoAir transformed the economics of planning and booking travel.
- Limo and taxicab services struggle to stop the erosion of their government-backed oligopolies by smartphone-based networks like Uber and Lyft.

What all of these companies, and countless others, have missed is that digitization isn't just another incremental change that can be adapted to fit an existing business model. Instead, it represents a radically new paradigm that demands an entire reexamination of the ways in which businesses compete for customers.

This new reality is illuminated in a new article by Michael E. Porter and James E. Heppelmann in the *Harvard Business Review* called "How Smart, Connected Products Are Transforming Competition."² Porter, of course, is the world's most respected business strategist. Heppelmann is the president and CEO of PTC, a software firm that helps manufacturers create, operate, and service products.

In his new work, Porter examines the impact of the newest digital applications on business strategy. Specifically, smart, connected products are forcing decision makers to confront a new set of strategic choices about everything from how to create value to how to structure relationships with business partners.

Smart, connected products are those in which the computing power is embedded in the products themselves. As Porter and Heppelmann explain, they consist of three parts:

1. Physical components

2. Smart components
3. Connectivity components

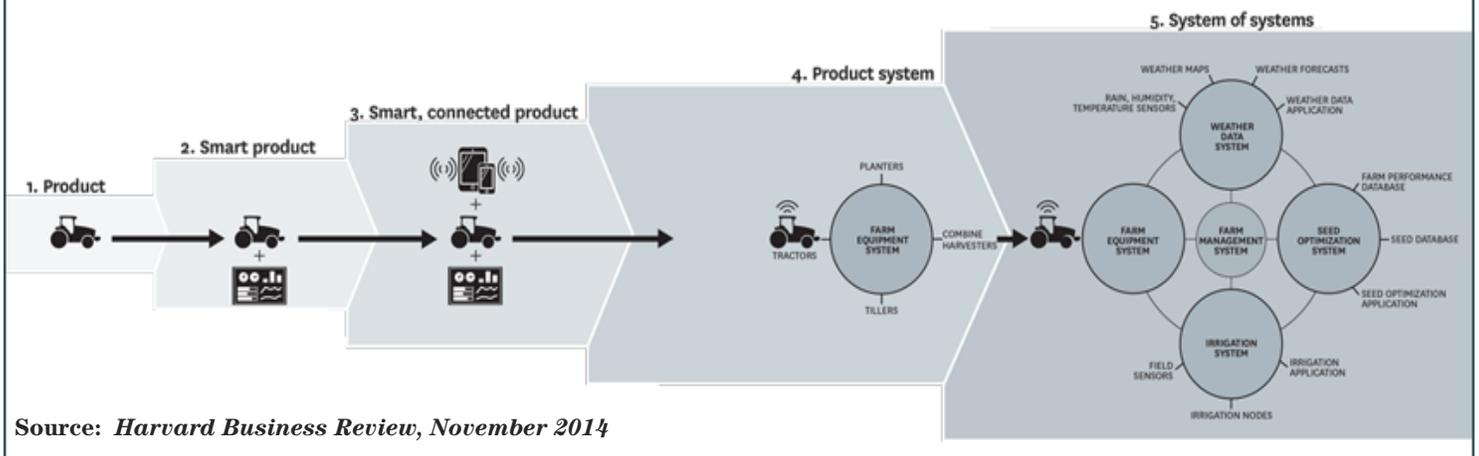
Physical components are the mechanical and electrical parts of the product, such as the engine block, tires, and battery of an automobile.

Smart components include the sensors, microprocessors, data storage, controls, software, an embedded operating system, and an enhanced user interface. The smart components of an automobile include the anti-lock braking system, rain-sensing windshields with automated wipers, and touch screen displays.

Connectivity components are the ports, antennae, and protocols that allow the product to communicate in one or more of the following three ways:

- In *one-to-one connectivity*, the product communicates with either the user, another product, or the manufacturer. An example is when a car is hooked up to a diagnostic machine that determines the cause of a problem.
- In *one-to-many connectivity*, a central system connects to many products at the same time. For example, the car manufacturer Tesla uses a system that connects to most of the cars it has produced, which allows Tesla to automatically maintain and update the cars' software.
- In *many-to-many connectivity*, products connect to other types of products and often also to external data sources. For example, the vision of the driverless car that we've explored in previous issues includes radar, lidar, computer vision, GPS, and sensors so it can detect the presence of other cars, obstacles, and road signs in order to navigate through traffic without a human driver.

Boundaries Change: A Smart, Connected Tractor Will Compete in a Broader Farm Automation Industry



Source: *Harvard Business Review*, November 2014

§§§§§§§§§§

According to Porter and Heppelmann, all of this is now possible because of several innovations, including:

- Breakthroughs in the performance, miniaturization, and energy efficiency of sensors and batteries.
- Highly compact, low-cost computer processing power and data storage, which make it feasible to put computers inside products.
- Ubiquitous connectivity ports and low-cost wireless connectivity.
- Tools that enable rapid software development.
- The rise of “big-data” analytics.
- The new IPv6 Internet registration system opening up 340 trillion trillion trillion potential new Internet addresses for individual devices, with protocols that simplify handoffs as devices move across networks.

§§§§§§§§§§

While the new products that will result from these technologies will improve the lives of users, *our* focus is on how they will affect business strategy. In 1979, Porter published his landmark theory of the five competitive forces that shape the structure of an industry.³ These five forces are:

1. The threat of *substitute products or services*
2. The threat of *established rivals*
3. The threat of *new entrants*
4. The bargaining power of *suppliers*
5. The bargaining power of *customers*

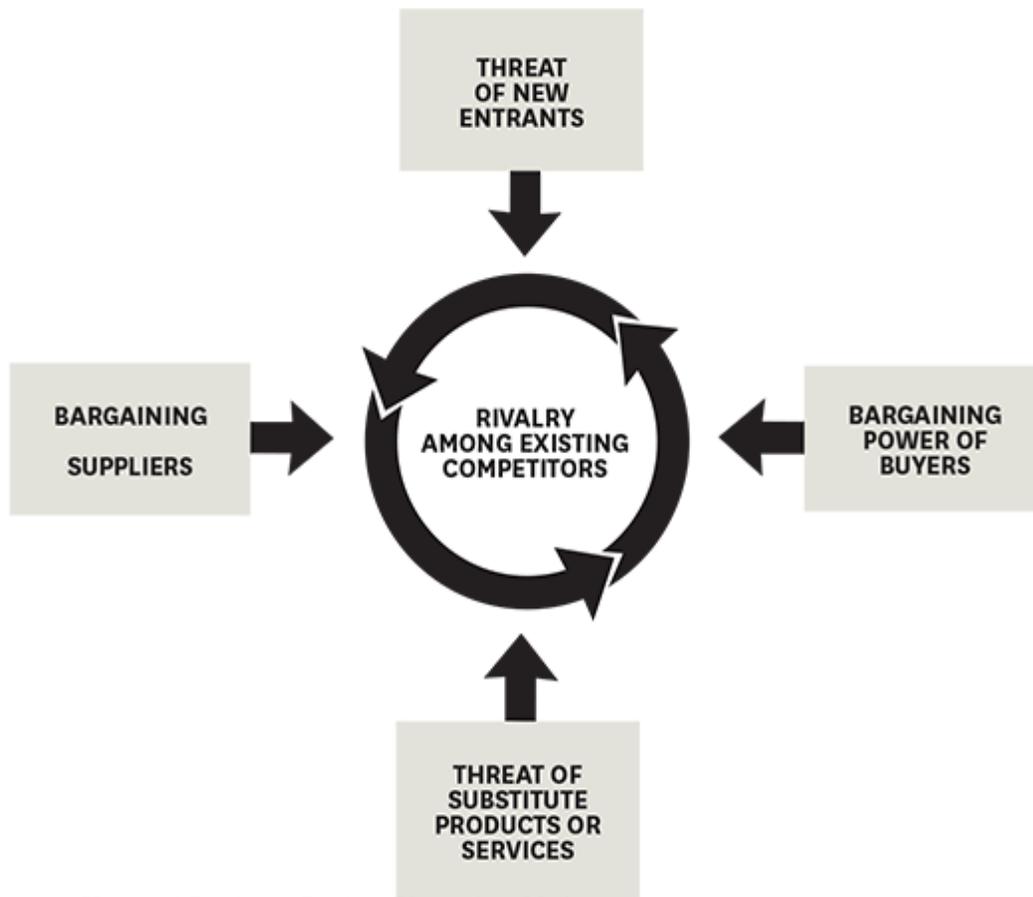
To understand the implications for business strategy, we need to consider how the technologies we’ve discussed will affect each of the five forces.

Let’s start with the **bargaining power of customers**.

In some ways, smart, connected products lower that bargaining power. For example, companies can differentiate their products, which means buyers can no longer treat them as commodities in which the only competitive advantage is offering the lowest price.

Also, the data that connected products capture enables manufacturers to segment their customers,

Bargaining Power of Suppliers



Source: *Harvard Business Review*, November 2014

customize their products to each segment, create value-added services, and charge higher prices. By using that data to provide richer experiences for customers, companies can increase the switching costs that buyers would have to incur to buy a competing product.

At the same time, smart, connected products can increase customers' bargaining power by enabling them to compare the performance of competing products more easily and more accurately. Gaining access to product usage data can also make customers less dependent on the manufacturer for advice and support.

In addition, emerging business models based on the new products, including "product as a service"

business models and product-sharing services, can give customers more power by lowering the cost of switching to a new manufacturer, since they don't actually own the product.

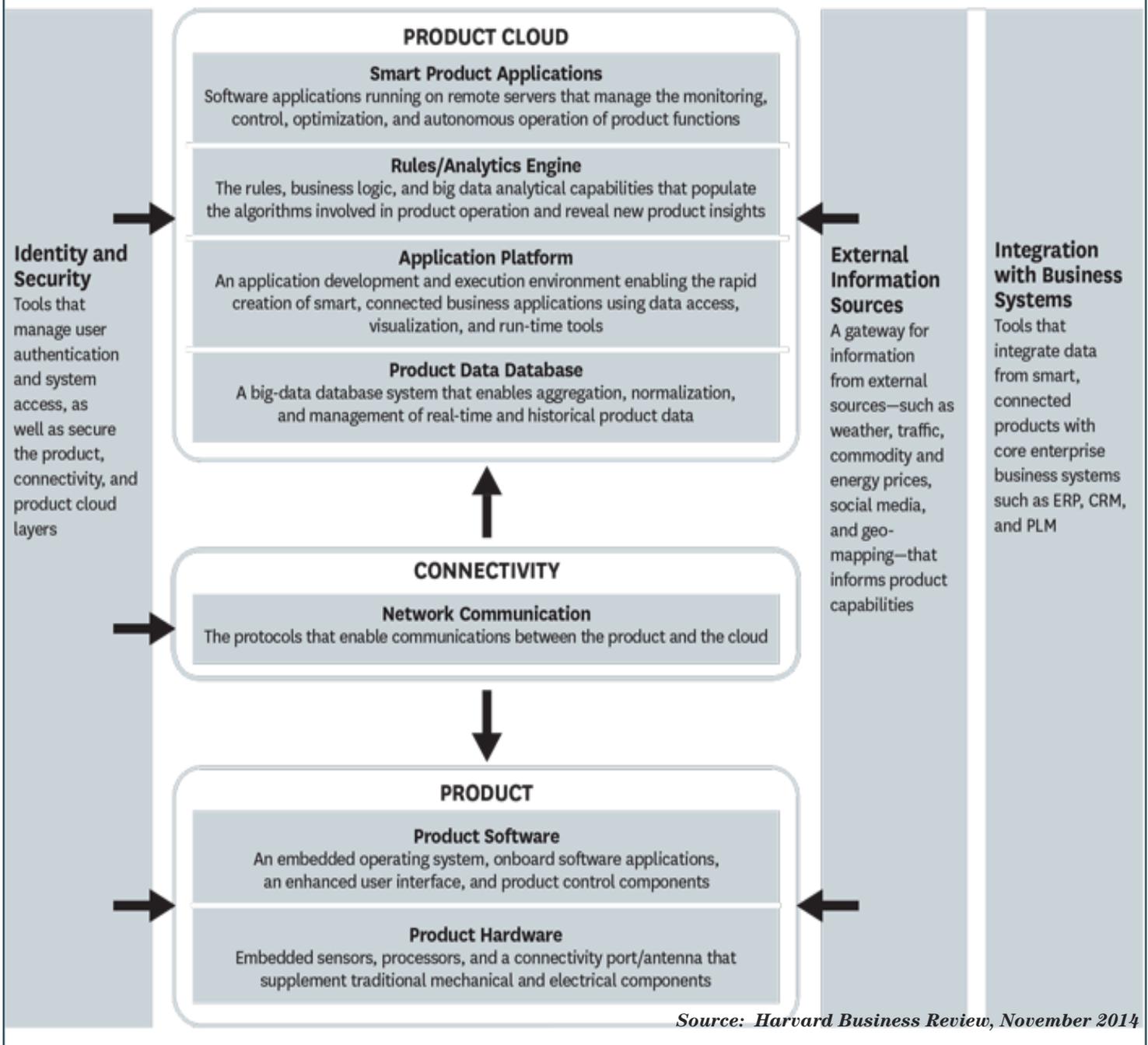
Smart, connected products can also change the **threat of established rivals**. As noted earlier, companies have more opportunities to differentiate their products, to provide value-added services, and to target narrower segments of the market, all of which can give one competitor an edge over its rivals.

Established companies can also gain an advantage

by allowing customers to use data from the products they use to improve their own performance. That's what Babolat, a manufacturer of sports equipment for more than a century, is now doing in the competition for buyers of tennis rackets. With its new Babolat Play Pure Drive system, which embeds sensors and connectivity into the handle of the racket, the company is marketing a smartphone application that monitors and evaluates ball speed, spin, and impact location to give tennis players valuable feedback.

Competition can also intensify as each company's products connect with the products of other companies. An example is the ecosystem built around the "smart home." Suddenly, companies that once competed only with their rivals in the markets for

Smart, Connected Products Require an Entirely New Technology Infrastructure



home lighting, home theater equipment, security systems, or climate control systems are all battling with all of the players in all of these areas for a dominant position in the ecosystem.

The threat of new entrants can be reduced due to barriers to entry. Established competitors in a market can build an insurmountable advantage by

using product data to improve their products and services, inspire buyer loyalty, and increase switching costs.

The complexity of connected products is another barrier to entry. Consider the medical products company Biotronik, which traditionally manufactured stand-alone pacemakers, insulin pumps, and

other devices. Today it markets a home health-monitoring system that includes a data processing center that allows physicians to remotely monitor their patients' devices and clinical status.

However, barriers to entry become less of an obstacle when incumbents continue to focus on their traditional offerings, leaving new competitors to offer smart, connected products that win customers away from the incumbents.

And even the established manufacturers that have made the switch to smart, connected products are being threatened by giants from the digital world. A prime example of the **threat of substitutes** is the much simpler, smartphone-based approach to managing the connected home that has been introduced by Apple, an offering that could siphon off much of the valuable data from the individual products made by various manufacturers.

§§§§§§§§§§

Another example is Fitbit's wristband device, which captures multiple types of health-related data, including activity levels and sleep patterns. Fitbit's offering is a substitute for conventional devices such as running watches and pedometers.

New business models enabled by smart, connected products can create a substitute for product ownership, reducing overall demand for a product. Product-as-a-service business models, for example, allow users to have full access to a product but pay only for the amount of product they use.

A variation of product-as-a-service is the shared-usage model. Zipcar, for example, provides customers with real-time access to vehicles when and where they need them.

§§§§§§§§§§

Another example is shared bike systems, which are springing up in more and more cities. A smartphone application shows the location of docking stations where bikes can be picked up and returned, and users are monitored and charged for the amount of time they use the bikes.

Shared bikes are likely to be a substitute not only for purchased bikes, but potentially for cars and other forms of urban transportation. Smart, connected capabilities make such substitutions for full ownership possible.

Finally, smart, connected products are affecting the **bargaining power of suppliers**. Physical components are becoming commoditized or even replaced by software, so the suppliers of those components are becoming less important and their bargaining power is shrinking.

At the same time, powerful new suppliers that manufacturers have never needed before are now emerging. Companies such as Google, Apple, and AT&T, which provide sensors, software, connectivity, embedded operating systems, data storage, and analytics, have increased bargaining power relative to the firms that need their offerings.

What can we expect going forward? Please consider the following forecasts, based on Porter and Heppelmann's insights:

First, the impact of smart, connected products on the five forces of business strategy will affect nearly every industry. The specifics of that impact will vary from one industry to the next. However, Porter and Heppelmann offer three broad guidelines:

1. Rising barriers to entry, coupled with first-mover advantages stemming from the early accumulation and analysis of product usage data, suggests that many industries

will undergo consolidation.

2. Consolidation pressures will be amplified in industries whose boundaries are expanding. In such cases, single product manufacturers will have difficulty competing with multi-product companies that can optimize product performance across broader systems.
3. Important new entrants are likely to emerge, as companies unencumbered by legacy product definitions and entrenched ways of competing, and with no historical profit pools to protect, seize opportunities to leverage the full potential of smart, connected products to create value. In some of these strategies, the system that connects products will be the core advantage, not the products themselves.

Second, firms will still need to apply the basic principles of strategy to achieve sustainable competitive advantage. As Porter and Heppelmann remind us, a company must be able to differentiate itself and thus command a price premium, operate at a lower cost than its rivals, or both. This allows for superior profitability and growth relative to the industry average. A company must choose how it will deliver unique value to the set of customers it chooses to serve. Strategy requires making trade-offs: deciding not only what to do, but what *not* to do.

Third, smart, connected products require a new emphasis on design. Product development processes will need to accommodate more late-stage and post-purchase design changes quickly and efficiently. Companies will need to synchronize the very different “clock speeds” of hardware and software development; a software development team might create as many as 10 iterations of an application in the time it takes to generate a single new version of the hardware on which it runs. Unfortunately, many manufacturing companies currently lack the expertise they will need in systems

engineering and in agile software development, which is essential to integrate a product’s hardware, electronics, software, operating system, and connectivity components.

Fourth, the new digital technologies present new opportunities for marketing. As companies collect and analyze product usage data, they will gain new insights into how products create value for customers. This will allow the companies to position their offerings more effectively, and to communicate the value of their products to customers more persuasively.

§§§§§§§§§§

Porter and Heppelmann point out that data analytics tools will enable companies to segment their markets in more sophisticated ways, to tailor product and service bundles that deliver greater value to each segment, and to price those bundles to capture more of that value. This approach works best when products can be quickly tailored at low marginal cost by making changes to the product’s software rather than its hardware. For example, John Deere once manufactured several different engines with different levels of horsepower to serve a variety of customer segments; today it can manufacture a single engine and then use software to easily adjust the horsepower rating to serve different markets.

§§§§§§§§§§

Fifth, as in any technology application in which valuable data flows freely, security will be a top priority. Smart, connected products will need to establish new authentication processes, provide secure storage of product data, prevent hackers from accessing product data and customer data, and protect the products themselves from hackers and unauthorized use.

Sixth, companies will face new human resource challenges. The competition to hire IT professionals, whose skills are already in high

demand, will intensify. Manufacturers will need to recruit or develop people with skills in such areas as software development, systems engineering, product clouds, and big data analytics.



December 2014 Trend #2

Resource List:

1. *CBS NEWS*, January 24, 2012, “Why Kodak Failed—and How to Avoid the Same Fate,” by Dave Johnson. © 2012 CBS News Interactive, Inc. All rights reserved.
<http://www.cbsnews.com/news/why-kodak-failed-and-how-to-avoid-the-same-fate/>
2. *HARVARD BUSINESS REVIEW*, November 2014, “How Smart, Connected Products Are Transforming Competition,” by Michael E. Porter and James E. Heppelmann. © 2014 Harvard Business School Publishing. All rights reserved.
<https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition/ar/1>
3. *HARVARD BUSINESS REVIEW*, March 1979, “How Competitive Forces Shape Strategy,” by Michael E. Porter. © 1979 Harvard Business School Publishing. All rights reserved.
<https://hbr.org/1979/03/how-competitive-forces-shape-strategy/ar/1>

Copyright of Trends Magazine is the property of Audio-Tech Business Book Summaries, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.