



How Smart, Connected Products Are Transforming Human Resource Management

An HR view of the new Harvard Business Review article, *How Smart, Connected Products are Transforming Companies*

THE DEFINITIVE ARTICLES ON THE IoT

PTC President and CEO, Jim Heppelmann, and Professor Michael Porter of the Harvard Business School, collaborated on a multi-year research project to understand the impact of smart, connected products, commonly referred to as the “Internet of Things,” on competition and companies.

The findings of their research were published in two Harvard Business Review articles, [How Smart, Connected Products Are Transforming Competition](#) published in the November 2014 issue, and [How Smart, Connected Products Are Transforming Companies](#) published in the October 2015 issue.



Michael Porter
Harvard Business School



Jim Heppelmann
President and CEO, PTC



“Smart, connected products will give rise to the next era of IT-driven productivity growth at a time when the impact of earlier waves of IT has largely played itself out.”

– November 2014



“Smart, connected products are transforming how companies design, manufacture, operate and service products, and ultimately, how they organize to create and capture value.”

– October 2015

TRANSFORMING COMPANIES: EXECUTIVE SUMMARY

[How Smart, Connected Products are Transforming Companies](#), the second in this two-part series, focuses on the impact of smart, connected products on companies' operations and organizational structure.

The unprecedented data and capabilities that smart, connected products generate are driving this transformation. The impact is reshaping the work of virtually every function in the Value Chain, including product development, IT, manufacturing, logistics, marketing, sales, and after-sale service.

In addition, new forms of cross-functional collaboration and entirely new functions are emerging:

- **IT & R&D Collaboration:** Reflecting the new need for IT in product development
- **Unified Data Organization:** Handles enterprise-wide data management and analytics
- **Dev-Ops:** Oversees ongoing product updates and efforts to shorten product-release cycles
- **Customer Success Management:** Ensures customers gain ongoing value to reduce churn

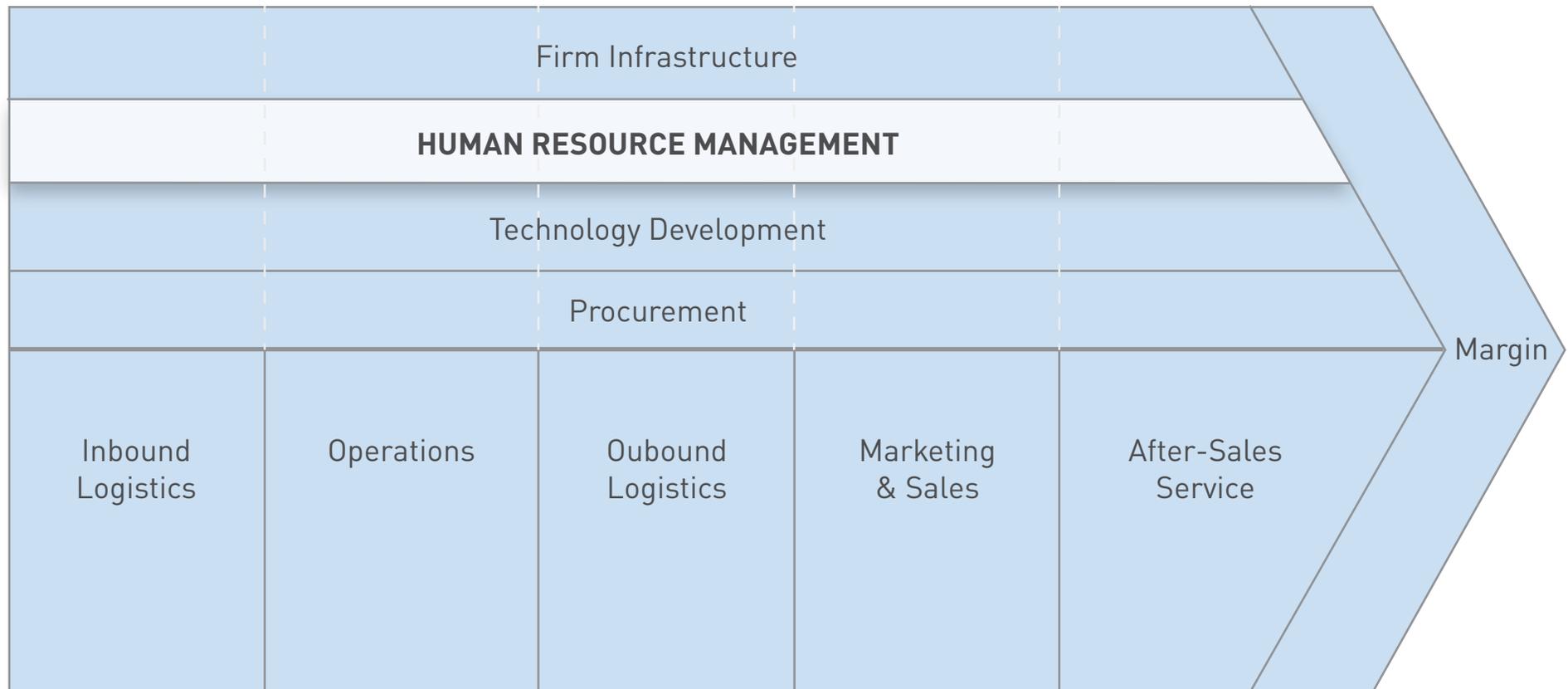
How will human resource management need to transform in order to enable and capitalize on the unprecedented data and capabilities that smart, connected products generate?



TRANSFORMING THE VALUE CHAIN

The Value Chain, a concept defined by Michael Porter in his 1985 best-seller *Competitive Advantage*, are the many discrete activities a firm performs in designing, producing, marketing, delivering and supporting its product. Each of these activities contributes to a firm’s cost and creates a basis for differentiation, which enables competitive advantage. Using Porter’s Value Chain framework, the impact of smart, connected products on each activity is analyzed.

The “Human Resource Management” activities refer to those involved in hiring and retaining the proper employees, developing the necessary culture and collaboration to help design, build and market smart, connected products and services.



TRANSFORMING HUMAN RESOURCES

A manufacturer of smart, connected products is a cross between a software company and a traditional product company. This mix demands new skills across the value chain, as well as new working styles and cultural norms.

These new human resource management principles are becoming foundational for competing in a smart, connected world:

▶	NEW EXPERTISE: Transition towards new skills, such as software development, data science, UI design, security, and systems integration. These skills needed to design, sell, and service smart, connected products are in high demand but short supply, especially acute in traditional manufacturing centers, many of which are different from technology hubs.
▶	NEW CULTURES: Designing, manufacturing, selling and serving smart, connected products requires far more coordination across functions and disciplines than traditional products. Need for new cultures, policies and norms to integrate and coordinate across functions, disciplines and work styles. For instance, the “clock speed” of software development is much faster than that of traditional manufacturing.
▶	NEW COMPENSATION MODELS: Need for new compensation models and incentives to drive innovation, collaboration, and new ways of selling. Especially for companies that shift towards service oriented business models. HR can also improve recruiting and retention by establishing a physical presence in innovation clusters.
▶	ENTIRELY NEW FUNCTIONS: Organizational structures are in rapid flux, even among the leading makers of smart, connected products. Companies are beginning to form three new kinds of units: unified data organizations, development-operations groups (or dev-ops), and customer success management units.

INDUSTRY ANALYST PERSPECTIVE

IoT Forces Manufacturers to Build HR Programs That Enable Innovation

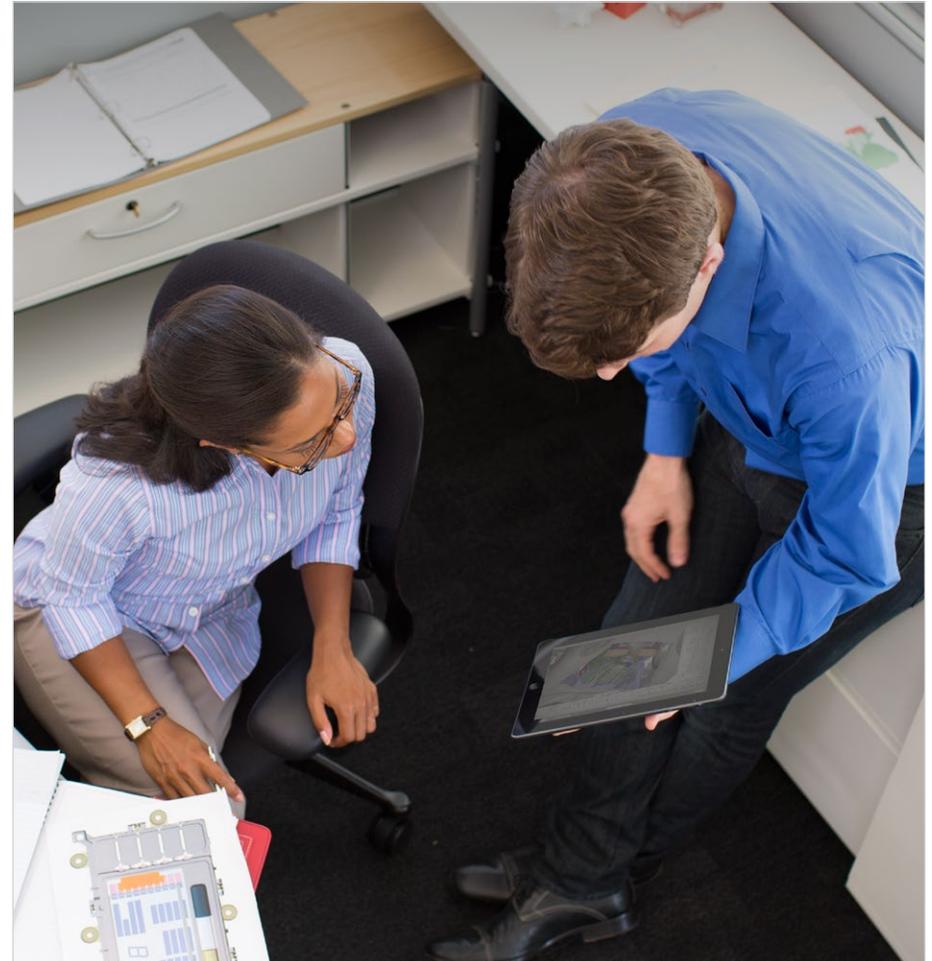
— By Michael Moon, *Research Director*, Human Capital Management

Not since the development of the steam engine by Scottish inventor and mechanical engineer James Watts in 1765 have we seen such a dramatic disruption to the people side of manufacturing as we will the Internet of Things (IoT). In an IoT world it is expected that nearly every object, device and consumer good will be connected to networks or the public Internet. By connecting billions of everyday devices to the Internet the IoT merges the physical and online worlds creating new capabilities, opportunities and new challenges for organizations, including people challenges.

In *How Smart, Connected Products are Transforming Companies*, Michael Porter and James E. Heppelmann posit there will be three shifts in HR that the manufacturers of smart, connected products need to build into their strategic approach to IoT. These include new or changing approaches to who and how organizations attract talent (expertise), the norms, values and unwritten rules of how work gets done (culture), and a need for new more flexible approaches to the way in which IoT workers are compensated.

Most would not argue that we are at the start of another Industrial Revolution. The rise of smart, connected objects will rival past technological marvels, such as the printing press and the steam engine. However, as with the Industrial Revolution, the driving force behind IoT causing such a disruptive shift in manufacturing is innovation. Innovation is most likely to occur when...

Read the [full article on PTC.com](#).



Aberdeen *Group*

SUMMARY

The capabilities and data generated by smart, connected products dramatically increase the opportunities for value creation and higher productivity, but require companies to build and support a [new technology stack](#) and face [10 new strategic choices](#).

This innovation is going to transform the nature of work across all business functions, which require new skills such as software development, data science, UI design, IoT security, and systems integration, that are in short supply.

We are still early in the transformation and the organizational transition will be evolutionary, with old and new structures operating in parallel for many years.

To get started however, it is critical for companies to align on these concepts across business functions and define a comprehensive strategy. Defining and prioritizing [IoT use cases](#) to pilot is the clearest path to creating value. If you're ready to go from thinking about IoT to winning in the new competitive environment of smart, connected products, request an [Innovation Workshop](#).



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