A N A L Y S T   C O N N E C T I O N

Heather Ashton
Research Manager

Smart, Connected Products in Manufacturing

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One of the most important drivers shaping the manufacturing industry during the next few years is the rapid adoption of smart, connected products and the product-as-a-service revenue model. Consider that by 2017, 70% of global discrete manufacturers will offer connected products, driving increased software content and the need for systems engineering and a product innovation platform. To capitalize on this paradigm shift, manufacturers and their technology leaders must now reassess their company's strategy around everything from billing to product design and from customer service to security.

The following questions were posed by PTC to Heather Ashton, research manager, IDC Manufacturing Insights, on behalf of PTC's customers.

Q. **A recent _Harvard Business Review_ article used Harvard Business School Professor Michael Porter's famous framework for strategy to evaluate the opportunities for smart, connected products. Does your research show that manufacturers are investing in this area?**

A: The short answer is yes: Manufacturers have been investing in smart products for more than two decades. Rolls-Royce pioneered this trend with its innovative approach to selling aircraft engines in a "power by the hour" business model. Placing sensors on its product provided Rolls-Royce with insight into product usage and allowed the company not just to sell the engine but also to sell the hours the engine operated. So, smart products, per se, are not new.

It is the "connected" part of the equation that is newer. Let me give you a real-world example: A piece of connected industrial equipment can now self-diagnose its error code and initiate a workflow to request a maintenance visit from a technician, including the necessary part to fix the machine.

This important addition of product connectivity now creates a broad horizon of both growth possibilities and new value for businesses, such as increasing revenue by viewing a company's products as platforms for selling additional services.

Ultimately, connected products also allow for a much richer customer experience, which in turn enhances the value of the relationship and thus the lifetime value of the customer to the manufacturer.

Q. **How are companies prioritizing these opportunities?**

A. The first step for most manufacturers is to change the organizational mindset from thinking about the product as a standalone entity to thinking about the product as a platform that generates smart service revenue. Manufacturers are then prioritizing the services that might be offered to customers in order of where the greatest source of value may be for their business.

Currently, the category most connected (excuse the pun) to what manufacturers have been doing is operation-based services. In this instance, manufacturers monitor the products, as well as their environment and performance, and take direct responsibility for their reliable operation. This is a paradigm shift that transforms the business model from solely products to products as a service.

This, of course, leads to consumption-based revenue models where the customer pays not for the product/asset but for the actual output or value received. For example, users pay only for the units of compressed air they consume rather than for the compressor itself. For the manufacturer, this not only can lead to higher margin revenue based on the strategic packaging of services but also turns the one-time revenue of the product sale into a predictable, recurring revenue stream for the life of the service contract.

Q. **What are other categories of use cases for smart, connected products?**

A. There are three general possibilities:

- **Augmentation.** This is an extension of operation, only now the manufacturer can add capacity or reprogram the unit on demand. Augmentation involves the evolution of products to becoming more software defined, where the physical product is a platform for different modes of operation based on the software installed.

- **Content.** Think of this as the app store model but applied broadly to any number of products. A database of soil chemistries or weather feeds added to the operation of agricultural equipment, for example, provides a composite view, giving farmers better insight into how to maximize the output and market value of their acreage.

- **Support.** This usually entails smart connectivity that relates to the delivery of the product-specific service rather than the product itself. It may entail direct control of the equipment, or it could be services that let the product operate in a self-correcting, autonomic way.

Q. **Could you expand on the support category a bit more?**

A. Let me provide two examples to help clarify:

- A CPG company puts RFID chips (sensors) on pallets of products at the request of its retail customers. This is a smart service that enables traceability.

- A pool chemical company puts sensors (and dispensers) in the pools of its largest customers — water parks and hotels — and monitors and adjusts water quality on their behalf. This smart service locks the customer in for an otherwise commodity product.

In these examples, the product itself isn't smart or connected, but a crucial (to the customer) product-related function is. This is important because often we consider only consumer durables or big pieces of equipment to be candidates for smart, connected products. But, really, every segment of manufacturing will be impacted.

Q. **What are some of the challenges to manufacturers once their priorities are determined?**

A. We see manufacturers coming to the point where they realize that many of their standard processes must be realigned to take full advantage of the opportunity. The obvious one is technology. New advances like the cloud, new technologies like sensors, and new requirements like security all must be sorted out. New ways of interacting with customers enabled by smart, connected products will require updated customer interaction technology as well.

Q.   Will organizations need to change?

A.   Yes, there's a need for new roles, such as chief analytics officers and UI software developers, to analyze, build, and support smart, connected product technology. Similarly, finance must adapt to new billing mechanisms. For example, most manufacturers are structured to bill on a traditional line-item basis and not on the ongoing services delivered by connected products. The Internet of Things and smart, connected products will affect people, processes, and technology.

Both front- and back-office systems, including ERP, CRM, EAM, BPM, will be impacted. The role of CIOs and the IT organization will be most impacted. The supply chain must now be a blend of both physical and cyber (service) fulfillment. And, perhaps most prominently, the new product development and introduction (NPDI) process must understand how to optimize service delivery as well as operation.

Q.   Would you provide some parting advice?

A.   My key piece of advice to manufacturers is to evaluate your current product portfolio and explore how smart, connected technologies can improve customer experience, drive revenue growth, and differentiate your offering in the market. Think holistically about your products — from design to manufacture to service — and integrate processes to ensure that each function benefits from the other.

A B O U T   T H I S   A N A L Y S T

Heather Ashton is a research manager supporting IDC Manufacturing Insights. In this role, she is responsible for research and analysis of key trends, technologies, and best practices in delivering service life-cycle management (SLM), leveraging the Internet of Things (IoT) to support after-sales strategies, managing warranty operations, and providing the customer with a unified brand experience for the life of the relationship. Ms. Ashton also supports research in the engineering- and technology-oriented value chains in manufacturing.

She regularly contributes to the retail and manufacturing blogs on the IDC Manufacturing Insights Community (http://idc-insights-community.com/manufacturing and http://idc-insights-community.com/retail) and tweets (@hashtonIDC) about business and IT issues relevant to asset- and brand-oriented manufacturers, as well as social business, cloud, and more.