

When product meets service:

digitalizing industrial innovation

“As more GMCs start to offer smart, connected and integrated product-services, many disruptions emerge that need to be understood and managed”

Restore to factory settings? **Not for the manufacturing sector.** With the rise of smart, connected and integrated product-services, it's time for a new blueprint that can successfully drive innovation in a second machine age.

► **JUST TWO DECADES AGO**, many global manufacturing companies (GMCs) generated most of their revenues from selling industrial hardware accompanied by repair and maintenance services. Over time, however, the service component has become more prominent, pushing GMCs to create integrated offerings where high-value services and products are seamlessly combined. In fact, many GMCs now generate the lion's share of their revenues from such offerings. This servitization of the manufacturing industry has often been painful for GMCs used to selling physical products and whose cultures were deeply rooted in a goods-dominant-logic.

In parallel, GMCs have also been exposed to increased digitalization. In the 1960s and 1970s, advances in IT automated individual activities and unleashed productivity gains, before the rise of the internet two decades later resulted in another wave of industrial transformation and allowed the development of innovative services and products. The evolution of digital technologies has thus been truly transformational across industries and has created new opportunities for revenue generation [1].

These two trends of servitization and digitalization are now converging – radically disrupting value chains and forcing companies to rethink how to secure future revenues and profits [2]. It has even been suggested that we are

currently experiencing a second machine age in which massive technological innovation, manifested in smart, connected and integrated product-services, will radically reshape companies, value chains, industries and ultimately the whole world [3].

So how will these smart, connected and integrated product-services influence and transform GMCs? And more importantly, what can GMCs do to proactively secure revenue and profits in the new emerging industrial landscape?

HOW SMART, CONNECTED AND INTEGRATED PRODUCT-SERVICES TRANSFORM INDUSTRIES

To untangle the complex issues related to industrial transformation, we apply the classical Porter's five forces framework, shown on the left of Figure 1. This framework provides insights into the forces that significantly affect the ability of a company to generate value for its customers and generate profits. As more GMCs start to offer smart, connected and integrated product-services, many disruptions emerge that need to be understood and managed from the five forces perspective.

Bargaining power of buyers:

Smart, connected and integrated product-services provide an opportunity for GMCs to differentiate their offerings and compete on value, rather

than price. They also facilitate closer relationships with the buyer or customer, with access to real-time data and usage information enabling effective customization and pricing policies. For example, truck manufacturer Scania offers fleet management services that enhance customer productivity by connecting intelligent systems across trucks and other platforms. In this way, the bargaining power of buyers may be reduced. In contrast, buyers may also improve their understanding of true operational performance through access to data and usage information, which decreases their dependence on the manufacturer for support.

Rivalry among competitors:

Smart, connected and integrated product-services allow GMCs to broaden their value proposition beyond traditional physical hardware to include new service and software solutions. Such combinations promote mass customization and thus diminish rivalry. For example, metal-cutting tool company Sandvik Coromant and its partners have developed a digitalized tool library called Adveon, which is intended to enhance usage of their product and service portfolio. The Adveon platform has emerged as an industry standard and is now open to other tool manufacturing companies. However, in other cases, such products may also result in higher fixed costs due to the costs of software development, maintenance and up-

grades, which can cause rivalry to increase as companies seek larger sales volumes to cover these fixed costs.

Threat of new entrants:

Barriers to entry rise when firms already active within an industry accumulate product data and use it to improve products and services, thus creating first-mover advantages. For example, Apple built a service development ecosystem around the iPhone and iPad that created substantial advantages over other mobile platforms. However, barriers to entry may also go down when smart, connected and integrated product-services leapfrog and challenge products offered by established companies in the industry. A well-known example is Kodak, whose slogan once was: "You press the button, we do the rest". The problem for Kodak was that there was no "the rest" left after digital technologies turned the whole photography industry upside down.

Threat of substitutes:

Smart, connected and integrated product-services may offer superior customer value and performance, thus reducing substitution threats. However, for many companies such offers may also create new types of substitutes. For example, when companies sell products-as-a-service, this may reduce the need for customers to actually own the product. Leasing combined with uptime

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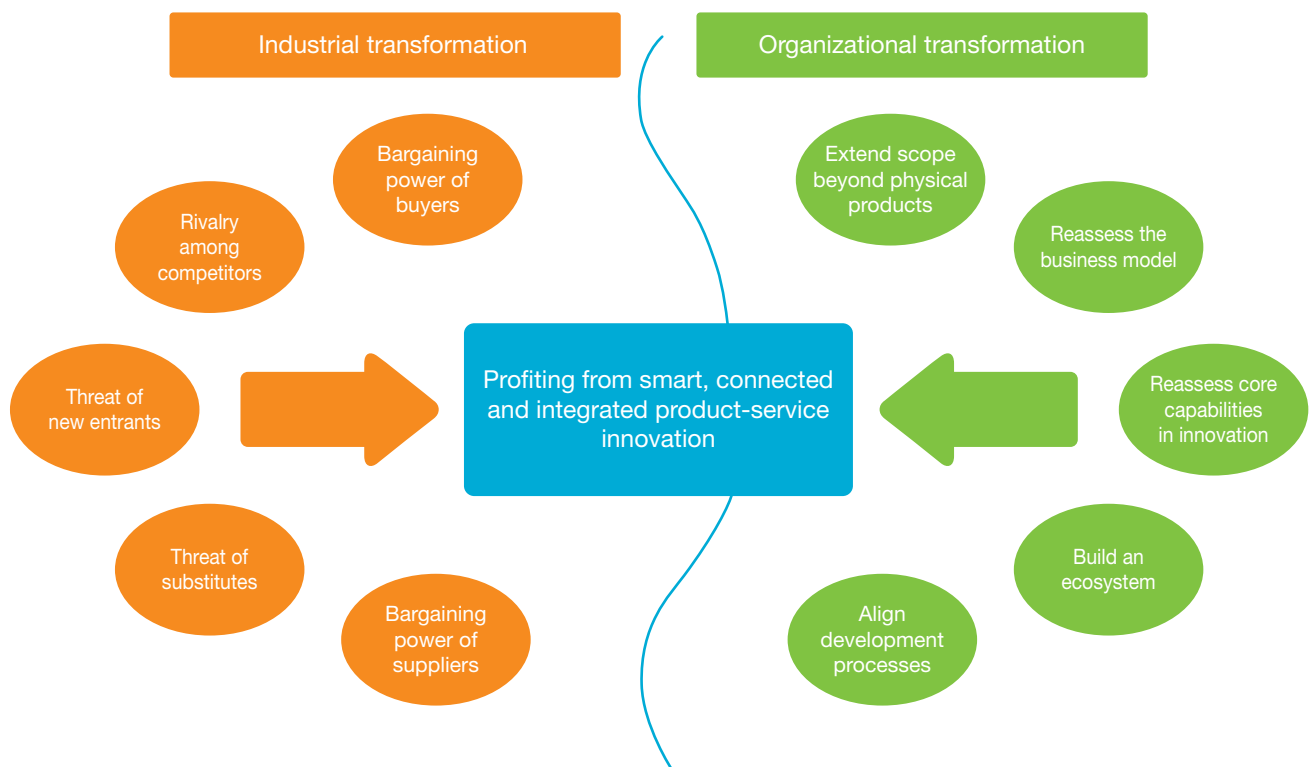


Figure 1: Profiting from smart, connected and integrated product-service innovation

service contracts is becoming increasingly common practice within heavy automotive industries, where key accounts gain access to equipment without having to sustain high ownership costs.

Bargaining power of suppliers:

Smart, connected and integrated product-services may reduce the bargaining power of traditional suppliers, since standard physical components become increasingly commoditized when smart components deliver more relative value. However, the reverse may also be true when companies are digitalized and powerful new suppliers of software, connectivity and analytics appear.

HOW CAN GMCS CAPITALIZE ON THESE CHANGES?

GMCS are undoubtedly facing an environment that is increasingly dynamic, complex, turbulent and challenging. All five competitive forces may in fact swing against incumbent firms, and not all companies will survive the shift to a highly digitalized and connected world. But this same environment also creates significant opportunities for GMCS to secure future revenues and profits. Indeed, the capacity to pursue an innovation agenda with a focus on offering smart, connected and integrated product-services may provide the edge needed.

So the question remains as to what GMCS can proactively do to secure innovation and thrive in this new industrial landscape. As shown on the right of Figure 1, we propose five strategic actions for GMCS based on insights from extensive data collection at a diverse range of manufacturing companies.

► **i.) EXTEND YOUR SCOPE BEYOND PHYSICAL PRODUCTS.** A smart, connected and integrated product-service is more than industrial hardware, although that may still be at its core. Instead, it is a combination of hardware, sensors, processors, software, connectivity, services and perhaps cloud solutions. Power and automation technology provider ABB has pioneered in this respect by introducing smart and connected physical products that can establish machine-to-machine communication, and by complementing industrial services with an intelligent physical platform, thereby generating high customer value.

► **ii.) REASSESS YOUR BUSINESS MODEL.** A business model sets out both how a company creates value for its customers (its value proposition) and how it captures that value (how it makes money). Smart, connected and integrated product-services may disrupt both. For instance, product-as-a-service models in which a manufacturer retains ownership may change revenue streams completely, with customers paying as they use rather than up front. One example is

Rolls-Royce's "power-by-the-hour" business model, which has been increasingly implemented by aerospace manufacturers and their component suppliers in contrast to the traditional transactional business model. It is important for GMCS to avoid undercutting current revenues before new value-capturing logics are in place. For example, "box selling" of products may generate large revenue streams in maintenance services, whereas outcome-based models would create new sources of revenues while pushing maintenance to the minimum.

► **iii.) REASSESS YOUR CORE CAPABILITIES IN INNOVATION.** Many GMCS need to develop new capabilities for service innovation. In addition, new technological areas, such as sensors and digital platforms, may complement old ones – or even replace them. Special attention should also be devoted to those capabilities that were once critical to competitive advantage but that perhaps are no longer so, since these can easily turn into core rigidities or dysfunctional routines that hinder, rather than help, a company's innovative efforts. In extension, this also has implications for human resources, for instance in recruiting.

► **iv.) BUILD AN ECOSYSTEM.** A GMC need not master every capability required for offering smart, connected and integrated product-services, nor provide every component, sub-technology or service. Instead, the key lies in building and strengthening a network of suppliers, customers and distributors (and perhaps even competitors) that has the capacity to combine related products and services into specific solutions. For example, automobile manufacturer Volvo Cars has collaborated with the energy company Vattenfall and regional dealers to create an ecosystem to support the launch and operation of new hybrid cars in Sweden. Other more general examples include Apple and Google, both of whom have been highly successful in generating value by building ecosystems.

► **v.) ALIGN YOUR DEVELOPMENT PROCESSES.** In most GMCS, products are developed cross-functionally, whereas service development is all too often an add-on to the product. In the digital era, hardware, services and software should be developed jointly under effective orchestration. For some projects, this may imply approaching the customer with a "blank paper" and without firm preconceptions, in order not to become trapped by legacy development processes that tend to weed out more radical projects.

CONCLUSION

The ongoing digitalization and servitization of the manufacturing industry poses threats to

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GMCS, but also brings a wide array of opportunities for companies who address them proactively. We suggest that two sets of activities are critical in this respect.

Firstly, undertaking a holistic and thorough industry analysis based on Porter's five forces framework can help GMCS understand how market forces are changing and evaluate their implications. Secondly, GMCS should identify areas for organizational development in order to capitalize on potential opportunities, with the capacity to pursue an innovation agenda as

the most critical goal. Our proposals are to extend the scope of products, reassess business models and core capabilities in innovation, and align development processes. On top of that, contributions from other actors in an ecosystem are needed to fully unlock new ideas and create new sources of competitive advantage.

Although potentially painful for traditional GMCS, the need for such development and renewed innovation is no longer optional, but rather a necessity to secure future revenue and profit in a new digital marketplace. ●

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► REFERENCES

[1] Marco Iansiti & Karim R. Lakhani, "Digital Ubiquity: How Connections, Sensors, and Data Are Revolutionizing Business", *Harvard Business Review*, November 2014, available at: <https://hbr.org/2014/11/digital-ubiquity-how-connections-sensors-and-data-are-revolutionizing-business/ar/1>

[2] Michael E. Porter & James E. Heppelmann, "How Smart, Connected Products Are Transforming Competition", *Harvard Business Review*, available at: <https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition/ar/1>

[3] Erik Brynjolfsson & Andrew McAfee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, W.W Norton & Co., Inc., New York: NY, 2014.