

Connected Services

New Manufacturing Models Increase Revenue Growth

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Executive Summary

Manufacturing companies are looking aggressively for new sources of revenue and profit – a need that cannot be met by traditional strategies that rely on product sales. Fortunately, there is a multitrillion-dollar market in services for connected products that offers a range of new revenue opportunities.

Providing services for connected products is rapidly changing the landscape for leading manufacturing companies. Advanced services and solutions will be based on machine-to-machine (M2M) data, analytics, and deterministic, low-latency networks that deliver high volumes of data within extremely short timeframes. These factors enable delivery of services that perform core processes – such as improved government services provided by public-private partnerships, healthcare optimization, improved energy generation and distribution, better transportation flow, and more efficient use of resources such as water and food – at an attractive price point to governments, businesses, and consumers. Many other markets will also be affected by the new services manufacturers are developing.

The new world of connected products and services has been called Industry 4.0, the Internet of Things (IoT), the Industrial Internet, Connected Manufacturing, Services 2.0, and the Internet of Everything (IoE).

This paper discusses four key elements of the new manufacturing model:

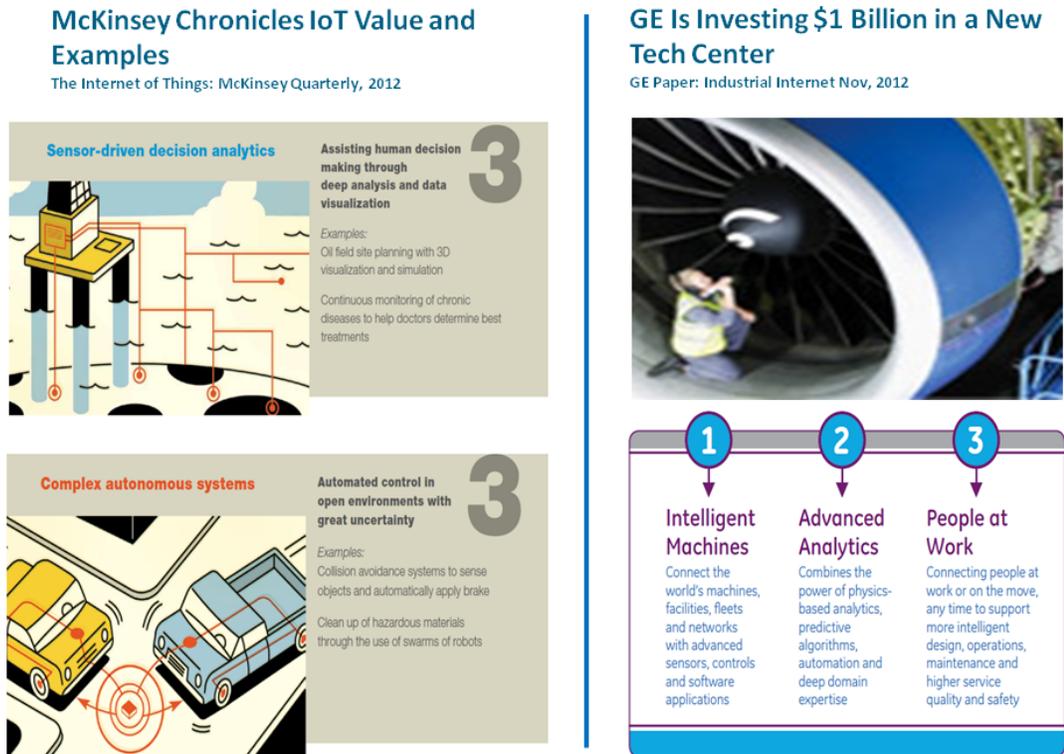
1. Rapid industrialization of the Internet is forcing manufacturing companies to change the way they do business.
2. New business models are increasingly dependent on services-based revenue to augment or even surpass product sales.
3. Multiple stakeholders exist, requiring a collaborative approach among ecosystem partners (“ecopartners”) to be successful.
4. Successful companies possess three key traits: strategic alignment, innovation vision, and technology strategy.

Manufacturers that move successfully to the new model will have a mix of connected services and products that optimizes customer performance. The result will be increased revenue and profits for manufacturing leaders.

Rapid Industrialization of the Internet Is Changing Manufacturing

A recent major change for industrial leaders is the emergence of services business models based on customers’ desire to convert from CapEx to OpEx. In the OpEx model, customers pay manufacturers for actual use and results, and do not purchase equipment. For manufacturers, providing services is a critical aspect of this model. Consequently, a move to “manufacturing as a service” is gaining momentum. Many leading manufacturing executives see a fundamental shift occurring in the marketplace (see Figure 1). Wider use of the latest technology and new, augmented experiences are increasing the market size for industrial services.

Figure 1. Recent Papers by McKinsey and General Electric Show Examples of the Growing Internet of Things (IoT) and Connected Products.



Sources: McKinsey & Company, 2012; General Electric, 2012

Globally, much of the future infrastructure for energy, transportation, healthcare, and public services will appear in emerging markets. However, many companies will find it impractical to provide on-site support services in these areas. As a result, they will need to provide remote services that combine technology advances for networking, distributed computing, and augmented customer experiences tailored to local cultures.

In developed countries, there is an abundance of infrastructure requiring support services. As the aging population of technical workers enters retirement, however, these employees are not being replaced quickly enough by younger workers. This retirement trend will occur in key industries such as energy generation, oil and gas, healthcare, and mass

transportation, creating new opportunities for manufacturers to provide remote services in order to continue operations.

New Business Models Depend on Connected Services

The new business models for manufacturing are driven by consumption patterns that rely on services for governments, consumers, and enterprises. Manufacturers are exploring a variety of growth options:

- Adapting new innovations to customer needs
- Focusing on technology advances
- Expanding globally
- Increasing social media / marketing efforts
- Creating new and engaging customer experiences

We already see changes in investment and financial models for leading manufacturing companies, which are investing heavily in connecting products and offering new asset management services to customers. One leading company calls this Services 2.0 and estimates that 70 percent of its future revenue will come from services (see Figure 2).

Figure 2. Examples of New Connected Manufacturing Services.

Industry / Service	Industry / Service
 Energy: Clean generation	 Oil & gas: Large capital projects
 Healthcare: Clinic management	 Automotive: Self-driving vehicles
 Aviation: Flight management	 Transportation: Traffic management
 Mining: Connected mine site	 Transportation: Rail mass transit

Source: Cisco IBSG, 2013

There are many examples of these services:

- GE is teaming with technology partners to build an “Industrial Internet” for key markets such as transportation, aviation, energy, and healthcare.¹ GE Aviation announced a service offering with GeoEye to provide digital images of airports to augment situational awareness for commercial and private aircraft.²
- In automotive, Ferrari and Apple have signed an alliance agreement to provide mobile “infotainment” to passengers using iPads and other Apple devices.³ Similarly, BMW offers a mobile hotspot with various service providers in Europe.⁴

- Caterpillar is expanding services for connected worksites. Rockwell, Siemens, and many others are offering services for smart factories, while ABB and GE are among those offering services related to energy generation and smart grid.

All of these new initiatives result in long-term customer agreements based on combined capabilities supporting connected products. These new capabilities may include remote monitoring and control, on-site monitoring, technical support services, and repair. Advanced networks are required that provide low latency, security, and real-time control, plus computing and storage at the product connection point.

Health equipment companies are offering new connected services to optimize patient care in clinics, as well as to increase utilization of techniques such as magnetic resonance imaging (MRI) and specialized patient monitoring. In the oil and gas industry, there are plans to explore deep-sea locations and remote geographies using sensors and other new technologies to collect massive amounts of data and transport it to engineering centers for analysis. Manufacturing companies provide connected pumps at gas stations, with video optimized for consumer interests. After inserting a credit card for gas, the customer receives video feeds tailored to his or her interests. As capital expenditures and project management costs soar, many companies and governments are looking for ways to reduce costs for large projects. Manufacturing companies can address this challenge, for example, by expanding service lines to reduce time and costs for large capital projects.

Figure 3. Examples of Evolving Business Models for Connected Services.

Business Model	Description	Financial Impact
Monitoring	Remote equipment condition reporting	Low margin / risk Annual contracts
Smart Analytics	Predictive analysis reporting	Medium margins / risk Annual contracts
Control and Optimization	Remote control, on-site support	Medium margins / risk Multiyear contracts
Performance Results	Partner management of core processes and business outcomes	High margin / risk Long-term contracts

Source: Cisco IBSG, 2013

Figure 3 shows examples of the rapidly evolving business models for connected services. Basic monitoring is commonplace in most industries, but more and more companies will move up the value chain to higher-margin, longer-term models over the next decade. This trend will be driven by increased technical capability, particularly in networking, distributed computing, and analytics. Partner suppliers will see the opportunity to arrange longer-term contracts with higher margins by managing selected processes. Promising candidates include self-driving cars, along with optimized traffic monitoring and management for smart urban environments. Automakers and suppliers, lighting manufacturers, technology companies, and others are already developing services in this space. While this trend

creates new opportunities for revenue and profits, it also requires new ways of looking at the market for industrial services.

Market leaders understand that these new models will incorporate bundled technology solutions and services. Leading manufacturers will need to interact with a wide range of partners to combine these bundles with successful business architectures. The business architectures for connected services will include varying levels of customer experience and network / endpoint connectivity (see Figure 4).

As it matures, the market will move to a more sophisticated partner model that emphasizes automation, virtual control, real-time operating systems (RTOS), and machine-to-machine (M2M) networks. This shift will become particularly rapid as the technology from ecosystem partners (“ecopartners”) develops. In the partner-operated model, the manufacturing company will provide services that manage results for a customer environment or operation. Most manufacturing companies are at the basic level now and moving toward partner-operated models.

Figure 4. Partnerships Become Increasingly Important as Connected Services Business Architectures Evolve.

Service Connect Level	Service-Offering Level			
	Basic Support			Partner-Operated
Customer Interaction	As-required consultation	Operation assistance	Augmented environment	Automated optimization
Services Network	DSL / VPN	Mobile wireless	Continuous connect	Virtual control
Endpoint Connection	Limited visibility	Remote monitoring	Low-latency, secure	M2M RTOS

Source: Cisco IBSG, 2013

Multiple Stakeholders and Collaborative Ecopartners

The markets for new services will grow faster than product sales, involving a large number of stakeholders. Key stakeholders (shown in Figure 5) include a consortium of industrial leaders, technology companies, service providers, software suppliers, academics, and government agencies.

Figure 5. Effectively Delivering Connected Services Requires a Broad Ecosystem of Partners, Led by Manufacturers.

Partner	Role
Manufacturing Leaders	Identify and develop new markets and services. Develop an ecosystem of new partners and technologies.
Technology Leaders	Provide new technology for networks and middleware that enhances delivery, security, and new forms of distributed computing.
Service Providers	Provide a premium service offering to support M2M connections and enhance speed and delivery of content.
Application Software Suppliers	Provide software and analytics to monitor and optimize core processes.
Academics	Support innovation at engineering and technology universities to encourage scientific breakthroughs and incubate new technologies.
Governments	Develop public-private partnerships for large-scale new public services.

Source: Cisco IBSG, 2013

As the models evolve, the combination of ecopartners will change to leverage scale and deliver connected services to a wider market. Initially, these models may include public-private partnerships as governments seek to increase service without additional tax levies (such as for optimized travel on mass-transit systems and urban vehicle traffic management). These partnerships are also expanding to encompass a wide range of services to support consumers and commercial enterprises. Examples include recreational services for passengers in self-driving cars, control of energy-generation services, and optimization of health services.

Three Key Traits for Success: Vision, Strategic Alignment, and Technology Strategy

Three key elements are required for manufacturers and ecopartners to be successful with the new business models: a vision for innovation, strategic alignment, and a technology strategy. As Figure 6 shows, each requires specific analysis, organization, and execution.

Figure 6. An Innovation Vision, Strategic Alignment, and a Forward-Looking Technology Strategy Are Essential To Making the Transition to a Connected Services Delivery Model.



Source: Cisco IBSG, 2013

A *vision* for business innovation requires identifying the market opportunity, then mapping game-changing tactics to deliver the new strategy. Leaders need to determine which markets, partners, and service offerings require analysis and planning.

Strategic alignment addresses organization, resources, and culture. The cultural and organizational changes needed to align resources require flexible employees who see the new opportunity and are willing to alter roles, accept new responsibilities, and live with uncertainty during the launch of the new services business. The manufacturing company must take a new look at market and customer business models. In several industries, changing technology, coupled with an aging workforce in developed countries, or with a lack of expertise in emerging countries, will require new services. For example, providing remote operational control of equipment can reduce costs and increase performance. This will mean a major cultural shift for customers and manufacturers alike.

The alignment process requires synchronization with new market opportunities. Executives will need to focus on the new business model, requiring a specific organization that includes marketing, strategy, business development, engineering, and ecopartner management.

A strategy for *technology adoption* will be critical. Scanning for new technologies⁵ that enable new processes and customer experiences requires individuals with vision and an external view. After the technology scan is completed and architectures defined, an ecopartner model is essential. The organization will need to develop new collaborative ways of working across company boundaries.

Call to Action: A Strategic Approach to Connected Services

Most manufacturing leaders are investing in new connected services offerings. They expect to achieve a sustainable advantage by providing customers with services that improve customer business performance or public services. These services will replace traditional business models in many industries and geographies.

To be a leader in the fast-growing connected services market, companies must take a strategic approach to developing differentiated connected services, beginning with the following actions:

- Create a vision of the new market and services
- Strategically align executives and resources
- Develop a technology strategy that includes ecopartners

The new models can bring great rewards, including greater market share, revenue, and profits. Manufacturers that accelerate the effort will increase revenue and profits for an extended period of time.

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Endnotes

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