UNLEASHING **HIGH VALUE SERVICES** THROUGH **CONNECTED ASSETS**

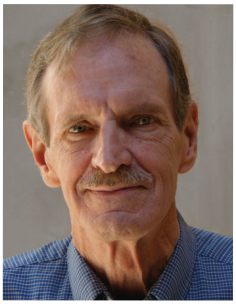
beecham research

Shaping the IoT future

SPONSORED BY

ptc

Robin Duke-Woolley,
CEO, Beecham Research



Bill Ingle, Senior Analyst,
Beecham Research

In these days of new technologies such as Artificial Intelligence (AI), Analytics, Augmented Reality (AR), Digital Twins, Edge Processing, Hybrid Clouds, and so on -- all of which are part of the IoT conversation -- many companies, including OEMs that manufacture machines and other high value assets, have yet to offer connected versions of their products. This means they are not only losing out on the high value service opportunities that this creates, but that they are potentially setting themselves up to lose market share to their competitors who have connected their machines and do have an ongoing IoT strategy. There is now no doubt that, for OEMs, connecting their products unleashes a whole new range of opportunities and competitive advantages that is transforming traditional product markets. Those that do not are taking an increasingly large risk of their products becoming disrupted and uncompetitive in the future.

WHY CONNECT PRODUCTS?

For product manufacturers (OEMs), there has never been a greater need or opportunity to connect their products to the Internet. As **Figure 1** shows, a product that is not connected stands or falls by the product offering itself. That offering cannot generate data for new services or be updated with new software features, so will quickly lose its competitive position in the market compared with others that are connected and can do these things. More than this, an unconnected product cannot be remotely maintained either and its performance in the field cannot be assessed. The total value of an unconnected product resides in the product itself, whereas the total value of a connected product includes both the product and all the services created by it being connected.

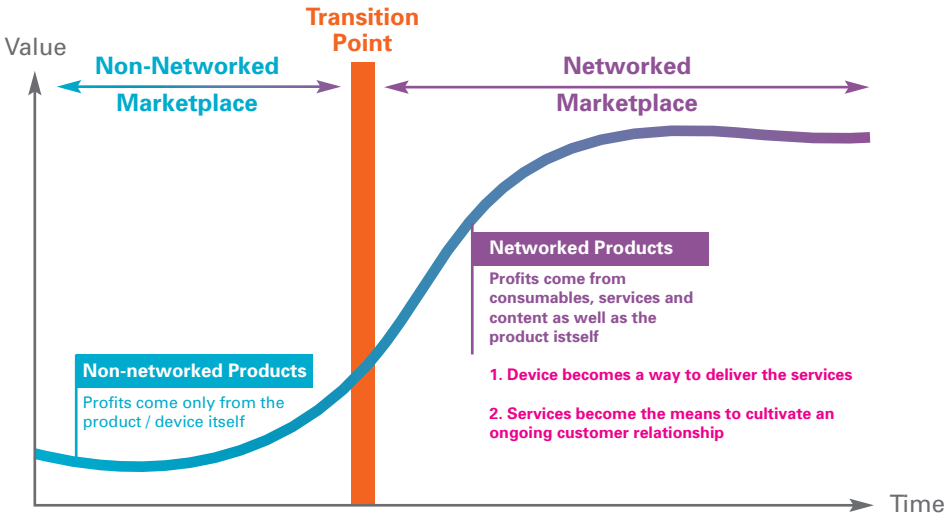


Figure 1: Connected products create more value than unconnected ones
(Source: Beecham Research)

In essence, that means a product that is not connected is likely to have an increasingly serious competitive disadvantage compared with a similar competitive product that is connected, and is therefore less likely to prevail in the longer term. OEMs in all sectors – Buildings, Consumer, Energy, Healthcare, Industrial, Retail, Security/Public Safety and Transport – must now develop service strategies for their offerings in order to compete in their own future market. That means they must include Internet connectivity for their products.

TOWARDS PRODUCTS AS SERVICES

Apart from providing the means for checking performance of a product in the field, and for updating its software, what else can a connected product offer that an unconnected one cannot? Examples abound. Those products that use consumables – such as printer toner ink, nitrogen for cooling or even coffee cartridges – can indicate when they are getting short and initiate re-ordering to prevent downtime. They can also check that replacement consumables are of known quality to prevent malfunction. In fact, introducing connectivity to a product creates a hierarchy of potential service offerings, each layer offering greater value, and the top layer is Product as a Service.

There are many examples of products being offered as services in the market. Tractors and construction vehicles are now increasingly being paid for on a time-used basis: when the vehicle is started up, monitoring commences and the transaction completes when the vehicle is switched off. Jet engines on aircraft are being paid for on the basis of thrust produced over a period, avoiding the capital outlay of what is otherwise a large fixed asset. Then there is the classic case of MRI (Magnetic

Resonance Imaging) scanners in hospitals and clinics. These scanners are large and expensive physical assets that need constant maintenance, upgrades and replacement of consumables. This represents substantial capital outlay and technical resources support for a hospital. However, by connecting them, manufacturers now offer them as a service. Hospitals pay for their use on a per scan basis, which in turn can sometimes be passed on to the patient and their insurance cover. So what was a straight capital cost is now an operating expense and can even become a profit center.

EXAMPLES OF WHAT OEMS ARE ALREADY DOING

1. Elekta Advances its Connected Service and Product Offerings

Elekta is a Swedish manufacturer of medical technologies for treating cancer and brain disorders. Assets are in operation in over 6,000 medical facilities and 3,800 employees worldwide, with over a quarter of those employees in the Service organization.

Companies in the competitive medical device industry are looking at how connectivity and smart devices can be used to generate more value for their customers as well as new sources of revenue. Elekta understands this opportunity and has been using this technology for the past decade to help differentiate its service business and expedite the way its products are serviced.

"Every year over one million patients are treated on our machines," says Daniel Kingham, Remote Service Program Director. "The importance of not missing a single treatment is absolutely paramount to them on both a physical and emotional level. If a machine is unavailable for multiple treatments, it may result in re-planning the remaining treatment which is not acceptable."

Kingham has led a commitment to leverage IoT and smart, connected products to deliver even more value to Elekta's customers and patients. These projects are facilitating a transition from a medical device manufacturer to a medical device and services company.

Like many companies, Elekta faces pressure to innovate with new products, improve the performance of existing products, and meet growing customer demands. In response to this pressure Elekta has undertaken a global project in partnership with PTC and ServiceMax to implement Connected Field Service with remote access. This new initiative represents the next step in Elekta's connected service strategy, expanding beyond the Elekta IntelliMax™ program for remote service that increased equipment uptime and allowed 20% of service issues to be resolved without dispatching a technician.

Kingham was tasked with implementing a solution to standardize and simplify systems, tools, and processes in Elekta's service organization. These efficiencies were needed for Elekta to remain competitive in the global market. Added to the mandate was a clear directive that customer service and response to their needs was to be of paramount importance.

By choosing Connected Field Service with remote access, Elekta can provide faster, more efficient and cost-effective service to its customers and their patients. This has opened up new possibilities, such as being able to predict service issues and address them proactively. In many cases, repairs can be effected prior to equipment failure, reducing or eliminating unplanned downtime. It also improves Elekta's ability to respond quickly to service requests and often resolve problems remotely. This level of service distinguishes Elekta and provides a competitive advantage.

Elekta faces competition not only from other equipment makers; distributors and other organizations also compete for the service revenue that has been an integral component of Elekta's business model. In the first year of this project Elekta carried out over 600 preventative actions. This translates to uninterrupted treatments for more than 14,000 patients.

2. Panasonic and Service Innovation: From Reactive to Proactive Device Delivery: Leveraging the IoT to Gain a Competitive Edge in International markets

Panasonic, which has No. 1 market share in the area of high-intensity projectors, has completely transformed its products into smart connected devices by leveraging a robust IoT strategy. Panasonic is pushing itself to become an innovative service organization capable of delivering "proactive service" that takes action before their products fail, instead of a break-fix "reactive service."

Although Panasonic's market position may appear strong and secure, manufacturers in and outside of Japan are competing for larger market share in the same space, expecting a growing demand for projectors. "It is becoming more and more difficult to differentiate ourselves with stand-alone hardware products," says Kazuyuki Kitagawa, Director of Service & Support at Panasonic AVC Networks. "In order for Panasonic to grow market share and overall business, it is essential for us to develop solutions that deliver significant added value."

Panasonic believes projection failure and quality deterioration should never happen. This has driven it to make its projectors IoT-enabled.

More specifically, Panasonic developed a system that collects data from projectors, visualizes detailed operational statuses, and predicts issues and address them before failure occurs. Its projectors are embedded with a variety of sensors that measure

power supply, voltage, video input/output signals, intake/exhaust air temperatures, cooling fan operations, and light bulb operating time. These sensors have been used to make the projectors more intelligent, automatically suspending operation when the temperature rises excessively, and automatically switching light bulbs. Although this was a great first step, Panasonic projectors were still not equipped with any capability to send the data over a network.

To transform their projectors into IoT devices, Panasonic developed a special device that enables the projectors to send data over a cellular network. By connecting this device to an existing projector, a variety of real-time sensor data can be retrieved and seamlessly sent to their remote monitoring system on the cloud from anywhere in the world.

Project data is gathered in the cloud and displayed on large screens at Panasonic Operation Centers in Japan and Europe. Proprietary algorithms were developed to monitor the data, so that if the system detects a potential failure, it looks into the lead-time of arranging necessary spare parts, gives an alert automatically, and sends an email to maintenance staff with details of the alert and expected timing of the failure. This remote monitoring system was developed based on Nippon Systemware's "Toami" IoT platform, which is powered by PTC's ThingWorx.

3. ThingWorx helps Embedded Energy Technology monitor real-time energy savings

With over 50,000 district and industrial steam facilities in the U.S, steam systems are one of the largest energy consumers in the United States, representing almost 15% of the country's annual energy usage. Embedded Energy Technology (EET), based in Pittsburgh, PA, is on a mission to not only save energy but to also prove it.

Founded in 2011, Embedded Energy Technology was the brainchild of a team of entrepreneurs who had previously worked for a company that developed a robotic inspection system. It incorporated sonar, laser and measurement sensors for water treatment and sewer systems, in an old and conservative industry.

One of the partners owned a company that made removable insulation for steam system components, and was seeing customer demand for post-installation verification of the energy savings provided by industrial insulation products. As a result, Embedded Energy Technology was formed.

A lot of large buildings, campuses, hospitals, etc. have large industrial steam. The steam systems are used not only for heating buildings in cold areas, but also for cooling them via heat exchangers in hot areas, or for sterilization of equipment in places such as hospitals.

"Insulation is placed on steam pipes that are radiating energy, and over time it may be removed to replace a component, or it is ripped off, and radiates heat into the environment. This can lead to excess energy converting water to steam, raising the ambient temperature of facilities to often intolerable levels. In many cases it's like having the heat and the A/C on at the same time!" said Embedded Energy Technology CEO P.J. Johns.

The sale of the removable insulation jackets that allow maintenance teams to remove a jacket, work on the component, and then replace, is based on energy savings numbers, and the company was frequently being asked to prove how much energy was being saved. The engineers at EET developed a sensor that could be mounted with the insulation to measure retained heat and provide insight into whether a component was functioning as intended. Each sensor measures 4 key temperatures: The inside jacket temperature, the outer jacket (touch) temperature, the ambient room or steam vault temperature, and the component temperature.

These readings provide a complete picture of what is happening inside the component, and are displayed in a Web Portal that analyzes and presents the data in a concise format.

The dashboard interface also enables email and text message alerts to be triggered when temperatures fall outside of the set range.

"Initially we thought that we would need to hire a couple of developers and build something from scratch over the course of a year, but once we saw the ThingWorx platform, we realized that we could skip that step" noted Johns. "The flexibility and rapid application development tools made it a much more practical proposition than building something from scratch".

In addition, customers can update mailing lists for email or text alerts or changing alert parameters, all of which was a manual process in the past. This flexibility was one of the key reasons EET chose ThingWorx as their IoT platform.

NEXT STEPS

There are now many examples of how, by connecting an asset or product, PTC ThingWorx IoT platform has transformed the market that the product competes in. A connected product enables a range of managed services to be offered that strengthens the product offering in its own marketplace and offers significant competitive advantage. At the top layer of those services is offering those products themselves as a service, rather than as a cost. This concept has already completely transformed some markets and will continue to do so in others. The availability of PTC's ThingWorx IoT platform, featuring easy application development, provides a way to achieve all levels of a managed service offering and means that no company need waste time and expense developing their own solution from scratch.

beecham research
Shaping the IoT future

ptc