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Winning With After-Sale Services:

The New Frontier of Machine-to-Machine

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Produced in collaboration with nPhase partner, AVNET

Abstract

Over the past several years manufacturing industries in US and many overseas markets have faced tough challenges. The National Association of Manufacturers (NAM) reports that in 2001, manufacturing utilization was the lowest since 1983, capital spending was down 30% from mid-2000, and nearly 2 million jobs were shed in a period of two years.[1] Recent indicators are a bit more encouraging. NAM reports that in 2002 the manufacturing sector rebounded out of recession and returned to growth. In December 2003, manufacturing enjoyed its best month in 20 years, according to The Institute for Supply Management (ISM).

There are many factors at play affecting the economic health of the manufacturing sector. This paper focuses on powerful new solutions that deliver profit growth and differentiation to product manufacturers – extending after-sale services as a compliment to products, and implementing Machine-to-Machine (M2M) solutions as a means to optimize service, differentiate, and generate new revenue streams. M2M is a large emerging industry forecasted to exceed $100 billion in revenues by 2010. Companies that manufacture or service equipment, devices or machines, or whose products are controlled or managed by machines should pay attention.

The Case for After-Sale Services

The information economy is impacting manufacturers at many levels. It plays favorably to the buyer, providing better access to information about products and pricing and increased buyer power. The downside is that with increased buyer knowledge and power this tends to reduce perceived differentiation and value-add, and ultimately loyalty. This is especially true in the more mature industries.

Many manufacturing industries have matured or are well along the path. This maturation process makes it increasingly difficult to achieve growth targets expected by stakeholders and investors, which are often set at "double-digit" levels. Faced with such challenges, many manufacturers today are taking a fresh look at new ideas and business models and consider them necessary tools to achieve desired business performance.

Extending after-sale services as a complement to products has been identified by leading manufacturers, consultants and organizations as a key driver for growth. After-sale services may involve a wide range of services that are provided in support of the sale of products, such as product installation, maintenance, repairs, extended warranty,

and replacement parts services. After-sale services offer many potential benefits. They create new recurring revenue streams, offer new sources of differentiation, and stand to offer a counter force to the slippery slope of commoditization that is so pervasive today in mature industries.

Leading management consultants have been reporting on the need for product manufacturers to transition into solution sales or services sales for many years. In 1999, Mercer Management Consulting published a paper "A Classic Pattern Transformed: Capturing Value as a New "Middle" Collapses."[2] In this paper, the emergence of information-based customer benefits is described as driving a powerful strategic pattern for product manufacturers, stating that "because of the growing power of information-based performance, managers can no longer afford to think of value-propositions only in product-based price/performance terms – if they do, they are in danger of being blindsided by competitors that exploit new value propositions made possible by the management of information." Other strategy consultants have also taken significant notice of this push to services.

"Raising revenues from after-sale services ought to be at the top of the management agenda for companies in maturing industries."

How to Make After-Sale Services Pay Off," Russell Bundschuh and Theodore Dezvane, McKinsey & Company[1]

As appeared in The McKinsey Quarterly 2003 Number 4.

The Association For Service Management International (www.afsmi.org) has served as an educational leader in this space, providing members with information on the emerging services industry they call S-Business, and assisting product manufacturers in setting a new course focused on the implementation of after-sales services.

Our findings have been that many product manufacturers have already implemented after-sale services, or are considering implementing new services, and that some have in fact grown their services business to a point of exceeding the sales revenue of associated products!

As stated by Fred Van Bennekom, Dr. B.A and Keith Goffin, Ph.D., in their article "Designing Products for s-Business Supportability."[3]

> "Long-term competitive advantage is achieved by clearly differentiating a company's products from its competitors. This differentiation should allow a higher price to be charged because of the greater value delivered. The differentiated product also may create a switching cost, which will help lock the customer in for repeat purchases. In the search for differentiation, marketers who think strategically recognize that customers don't just concentrate on the tangible product; they also take a critical look at the services that

augment the product, such as financing and support services. Thus, the entire product-service bundle should be scrutinized to find the best opportunities for differentiation. Typically, features of the tangible product have often been the first place to look, but the augmenting services in the overall product-service bundle— the s-business—may prove more fertile ground. In fact, as companies move to s-business models, we may speak of the tangible product as augmenting the services."

The Case for Machine-to-Machine

The ability to remotely connect, monitor and/or control machines has been around for many years. However, up until very recently, it required expensive proprietary hardware and communications, making it difficult and uneconomical to implement large-scale deployments.

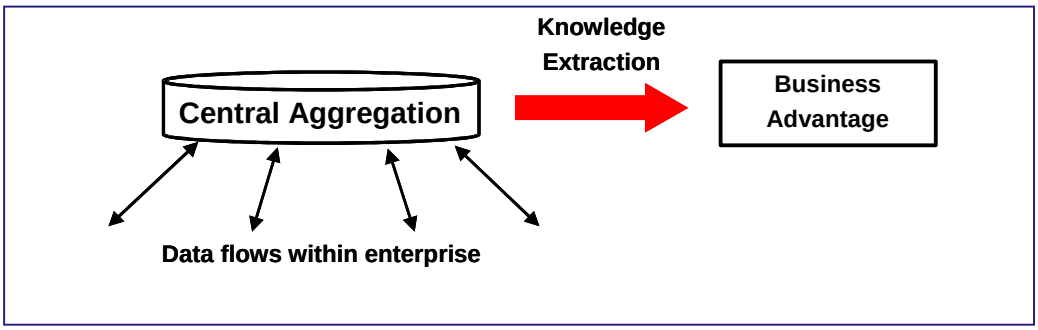
The convergence of several factors has become the catalyst for enabling cost effective, reliable, large-scale deployment of these capabilities:

- A global public wireless infrastructure
- Digitization of machines
- Faster, smaller, cheaper processing power
- The World-Wide Web as part of the network and the user interface
- Big players are getting involved such as Nokia, AT&T Wireless, Avnet and others
- Standards – TCP/IP, HTML, XML, SMTP, SNMP…

An industry category has also emerged along the way, called Machine-to-Machine or M2M. M2M is about connecting machines dispersed across an enterprise with computers and people, delivering information-based advantages.

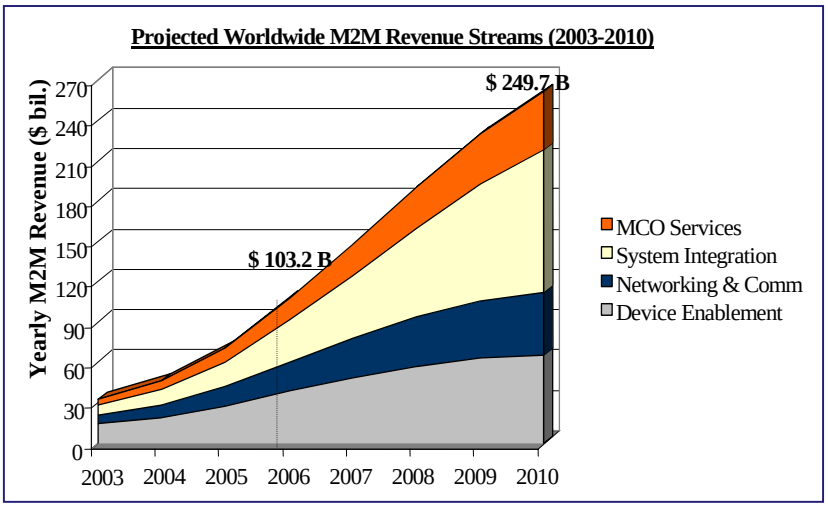
The overall concept is quite straightforward. Just like the Internet consisted of connecting computers in the 1990's, M2M is about networking machines, computers and people. Although M2M has many potential Business-to-Consumer (B2C) applications, this current phase of M2M is targeted at Business-to-Business (B2B) applications.

Figure 1 – M2M Delivers Knowledge-based Advantages



M2M solutions provide a means of connecting manufacturers' products to a digital network for the purpose of gaining powerful knowledge-based advantages in extending "after-sale" services. People who need to know information about the status, performance history, or service needs of machines can get this information regardless of their location. Users gain an "enterprise" view of their assets so key monitoring and service information for all assets and business operations is viewable via a consistent user interface. Data is centrally aggregated and there are extensive tools designed to convert data into knowledge to drive more informed decision-making.

Figure 2 – Projected M2M Revenue Streams



Source: *The Focal Point Group*

"Mobilizing the machine means enabling a machine to transmit and receive information through a cellular connection whenever and wherever the need arises—limited only by the coverage area of the cellular network."
Deloitte Research

"$100 billion combined in revenue seen by 2010 for US, Japan and Western Europe in M2M business."
McKinsey and Company

"There will be more invisibly connected machines and physical objects than visible humans from 2005 onward."
Forrester Research

"By 2007, there will be between 100 million and 160 million machine-to-machine connections worldwide that use wireless mobile phone networks."
Gartner Group

Evidence of the viability of this industry is pretty extensive. One indicator is the emergence of an industry publication called M2M Magazine (www.m2mmag.com), published by Specialty Publishing Co., who also publishes Start Magazine, a well-known publication dedicated to the manufacturing sector. Another sign is the extensive coverage M2M has been starting to get from leading analyst firms like Gartner and Forrester as well as an emergence of analysts dedicated to the space, like The Focal Point Group, Wireless Data Research Group and Harbor Research.

While analysts do not entirely agree on market size, Harbor Research reporting an estimated $250 billion market by 2010, and Wireless Data Research Group reporting an estimated $28 billion by 2007, it is clear that the M2M market is large and rapidly emerging. Simply put, there are some 50 billion machines in the world, most of which are not monitored in any automated way.

Making The Connection

So far in the paper we have made a case for two major trends, after-sale services and Machine-to-Machine. Next we provide a link between the two and discuss the powerful implications of combining them.

Lets assume a fictitious company, ABC Manufacturing, has decided to pursue an after-sale services business focused on providing maintenance and repair services to end-use customer markets for its product line of industrial machines. The Company has been in business for over 50 years and has over 75,000 of its industrial machine products operating in North American end-use markets. This installed base of assets comprised the initial target market for the provisioning of after-sale services.

Using a conventional approach to service, ABC Manufacturing determined that to achieve 80% coverage of this asset base, it would need to open twenty-eight service centers over a three-year period, and employ an average of ten service technicians, one manager and one office administrator per service center region. These service centers would also serve as the primary distribution hubs for its industrial machine products. Services would be rendered based on scheduled preventive maintenance service agreements, or by reacting to customer service requests. In either case, service would be provided without having visibility into the state, performance, and service history of the machines that are being serviced.

Fortunately, ABC Manufacturing discovered the possibilities of M2M and had the ability to completely re-think its after-sale service business model. The key drivers in considering M2M were to provide a new source for:

- Recurring revenues
- Differentiation
- Efficiency improvements
- Business intelligence

Provide a New Source of Revenues

ABC Manufacturing conducted its own research to determine service bundles, customer segments and value. This resulted in a grouping of customers based on three categories:

1. Restorative Segment – customers that would perceive the most value from a service that would help them correct problems more effectively and efficiently.
2. Opportunistic Segment – customers that do a good job following prescribed maintenance practices but would perceive value if there was a way to reduce total cost of ownership and/or improve performance.
3. Preventive Segment – customers that set the standard for best practices in the industry each and every year and are constantly striving to improve.

Services were grouped into three standard billable packages:

- **Remote Diagnostic Service**
- **Customer Assurance Service**
- **Knowledge Management Service**

The Remote Diagnostic Service would provide the customer the ability to have an expert diagnose their machine remotely and would enable ABC Manufacturing to solve problems more quickly and cost effectively. The primary target was the Restorative Segment, although the Opportunistic and Preventive Segments were expected to see value in this service as well.

The Customer Assurance Service would be designed to provide customers piece-of-mind and assurance, knowing that experts are maintaining a watchful eye on their machine on a 24-hour 7-day per week basis. Experts would instantly know when any early warning signs of a problem exist and would have easy access to the performance and operating history of the machine. This service was targeted at the Opportunistic and Preventive Segment.

The Knowledge Management Service would allow ABC Manufacturing to measure and compare the performance of machines operating in end-use markets. This would enable customers to learn how the performance of their machine compares with other key benchmarks. Benchmarks could be industry norms, enterprise norms, or norms that were specific to an individual customer. The initial target was the Preventive Segment. However, with the assistance of educational and training programs ABC Manufacturing determined the Opportunistic and Restorative Segments might ultimately perceive value of this service as well.

In addition to the above new billable services, ABC Manufacturing determined it could also increase revenues of current on-site services, replacement parts and product sales. With the Customer Assurance Program in place, service personnel and service contractors would be in a desirable position of calling the customer to explain that service is required before the customer had any knowledge of an ensuing problem or service need. With this type of proactive call, ABC Manufacturing determined that service loyalty would likely improve, preventing the competition from gaining the service business and increasing the amount of service per machine that is realized for the average customer.

ABC Manufacturing also determined that customers across all three segments would perceive the new services as value-added and differentiated. This would provide incremental advantages that would not easily be reproduced by the competition, allowing them to compete more effectively in the sales of their industrial machine products.

Provide a New Source For Efficiency Improvements

While revenue growth and differentiation were identified as the key drivers for the M2M Solution, there were also additional opportunities for efficiency gains within their after-sales service model. Replacing initial on-site service calls that would be used only to diagnose a problem, with a remote diagnostic service, was one of the key targets. Using asset management and service management software modules, ABC Manufacturing could provide robust information pertaining to asset and service history to people who need to know, all through the convenience of a single web-based user interface. Combined, these new capabilities would allow ABC Manufacturing to increase the average service revenue per technician and reduce the required labor force.

Provide a New Source for Business Intelligence

By centrally aggregating data, ABC Manufacturing determined that it would be in the desirable position of extracting business intelligence from the enterprise of assets. One of the key targets was to establish performance metrics and industry norms as previously mentioned. Product developers and managers were also intrigued with the extensive additional possibilities.

Business Requirements

The World Wide Web would be used as part of the network and user interface. The software would be classified as Enterprise Class. This means users would have visibility into the entire enterprise of assets they are responsible for (regardless of their location) from a single summary screen. From this summary screen, users would be able to drill down to specific asset information, or analyze enterprise data in virtually any way. The specific features and functionality of the software, and data analysis tools, were further specified to meet their unique requirements.

The software would need to be architected to allow flexibility in controlling what each user is able to see and do when logged on to the web site. For example; an ABC Manufacturing customer may have visibility limited to the machines at their site; an ABC Manufacturing service technician may have visibility across all customers signed up with the program within his service region; a service center manager may have visibility across his entire base of customers; and ABC Manufacturing corporate personnel may have visibility for all customers globally.

The application would need to have comprehensive notification and escalation procedures to warn of alert conditions. Also, it would need to enable the company to track service levels delivered, and asset information.

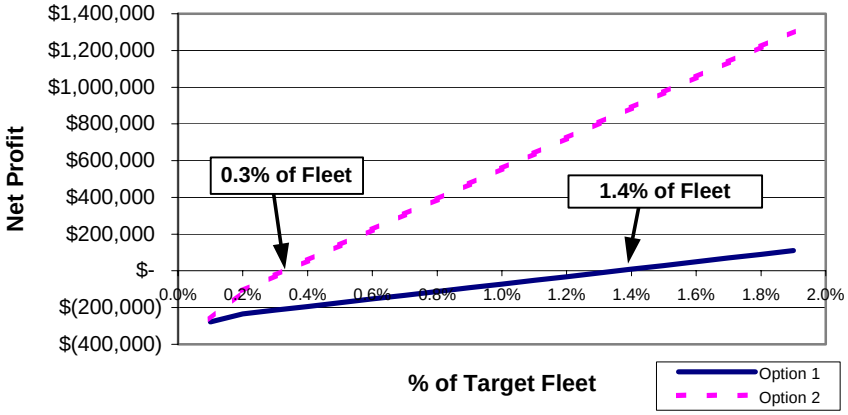
A device would interface and communicate with any of the Company's industrial machine products, and connect to a 24/7 Network Operations Center (NOC) through a variety of communications paths (cellular wireless, dial up, Ethernet). The solution would need to be fully integrated with and supported by the NOC ensuring high availability. Data would need to be centrally aggregated for a minimum period of one year with back-up data files for extended periods.

The Business Case

The total end-to-end solution would involve a combination of custom-built devices that would interface with ABC Manufacturing's machines, various communications options, enterprise class software, and a 24/7 Network Operations Center.

The Company developed a business model yielding gross margins in the range of 50 to 80% in the first year of deployment, and crossing the break-even threshold when the solution was deployed at between 0.3 and 1.4% of the target fleet of machines. By deploying this solution to 5% of its fleet population over a three-year period, ABC Manufacturing estimated a conservative three-year net present value was in the range of $3.7 and $8.3 million, depending on various scenarios.

Figure 3 – Break-even Analysis



This analysis did not factor the multiple opportunities to increase revenues of existing products and services or opportunities for operational savings. Adding these factors would have improved the economic model.

The New Frontier

nPhase has been implementing M2M solutions for the past five years in large-scale production environments. What is new is that the convergence of these technologies and business processes are providing compelling economics and performance. This is creating new business opportunities across a wide range of markets and is setting the stage for a new competitive landscape in the digital age.

Where we are today is only the beginning. In 1990 people were only just beginning to view some of the value and business opportunities that could be derived from networking computers. The Internet significantly extended this value. Visionary companies see M2M in a similar vein with even greater opportunities to achieve near term cost savings, while positioning their company to assume a confident, leadership role as they transition into the information economy of today and tomorrow.

About the Authors

nPhase, LLC, a Chicago-based M2M technology company, delivers a new level of business performance by connecting machines, people and information systems. McKinsey & Company forecasts this emerging industry called Machine-to-Machine (M2M) will generate $100 billion in annual revenues by 2010 in the U.S., Japan, and Western Europe. nPhase, with 14 years experience as an IT consultancy, provides its M2M solutions to OEMs and service organizations involving large-scale deployments of thousands or more widely dispersed assets. nPhase is a "one-stop shop" for M2M solutions. nPhase has strategic partnerships with some of the leading companies in the industry, including Nokia, Avnet, AT&T Wireless, Opto 22, Atos Origin, Advantech and others.

nPhase customers include Checkers Restaurants (CHKR), SpectraSite Communications (SPCS), BioLab (GLK), and others. nPhase customer BioLab was a 2003 award winner for the Field Force Automation FFAST Track Awards. For more information please visit: www.nphase.com http://www.nphase.com/.

Avnet Applied Computing Solutions, a division of electronics distribution leader Avnet Inc. (NYSE:AVT http://www.avnet.com/investors/stock/) has a unique relationship with nPhase to bring the benefits of machine-to-machine (M2M) communications to embedded original equipment manufacturers (OEMs) in North America. Working with Nokia's line of M2M products, Avnet Applied Computing Solutions will market, support and integrate nPhase's M2M solutions products with Avnet's customer base of embedded OEMs, solution providers, value-added resellers (VARs), and independent software vendors.

Avnet Applied Computing Solutions focuses on the unique requirements of computing OEMs, independent software vendors, and value-added resellers looking to get embedded systems or wireless and data collection solutions to market quickly. By partnering with ACS to provide engineering, integration, logistics and support services, your company can focus on developing innovative solutions for your customers more quickly and profitably than your competition. ACS leverages the supply-chain leadership and global presence of parent company Avnet Inc. to provide its customers with the world-class supply-chain management, financing and distribution capabilities that help them be "First to Market(TM)." More information can be found at http://www.avnet.com/investors/stock/.

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[1] "2003 E-Commerce Trends Report," The National Association of Manufacturers and Ernst & Young, 2003
[2] "A Classic Pattern Transformed: Capturing Value As A New "Middle" Collapses," Ted Moser, Mercer Management Journal, Mercer Management Consulting, 1999
[3] "Designing Products for s-Business Supportability," Fred Van Bennekom, Dr. B.A. and Keith Goffin, Ph.D. , The Association For Service Management International, October, 2001
[4] "How To Make After Sale Services Pay Off," R. G. Bundschuh and T.M. Dezvane, The McKinsey Quarterly 2003 Number 4.