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# **E-Commerce with Web-Based Standards: A Case Study in Implementing RosettaNet Process Standards at Avnet, Inc.**

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## Executive Summary

Web-based open standards are a very new development in B2B e-commerce connectivity, and momentum leading to their adoption is rapidly building among industry leaders. This case study examines the process improvement benefits, quantifies the financial benefits, and describes the implementation process used at Avnet, Inc. to implement three RosettaNet Partner Interface Processes™ (PIPs™) in Order Management.

### *Benefits from process improvement*

Process improvements led to reduced costs, increased order management efficiency, and increased data accuracy. Specifically, benefits from process improvement include

- Reduced manual processing, such as checking for PO accuracy, re-keying of order shipment confirmations and order status updates, and intervention in handling PO exceptions.
- Streamlined information flow and increased visibility to information, such as automated order status posting, online order status viewing, and automated PO initiation.
- Standardized data content and format, which facilitated a quick implementation and positioned Avnet to capture further benefits from the newly enabled technology.

### *Quantified financial benefits*

The financial benefits from implementing RosettaNet process standards at Avnet are significant, despite the preexistence of a reasonably effective EDI system. The operating cost in the theoretical baseline case, where no processes are improved, is compared to the operating cost of the RosettaNet improved process along with the implementation costs. Over the five-year period from 2000-2004, the net present value (NPV) of the theoretical baseline case costs is \$13.8 million and the NPV of the RosettaNet case costs (including startup costs in 2000) is \$11.8 million. Therefore, the NPV of the cost savings over a five-year period is \$2 million. The corresponding five-year return on investment (ROI) is 230%. Methods to quantify other financial benefits are also described, including benefits from inventory reduction and invoicing customers more quickly.

### *Implementation process used by Avnet*

Implementation success for Avnet depended on the management of a set of critical success factors. By managing these critical success factors, Avnet skillfully implemented three RosettaNet PIPs with one supplier. The critical success factors include

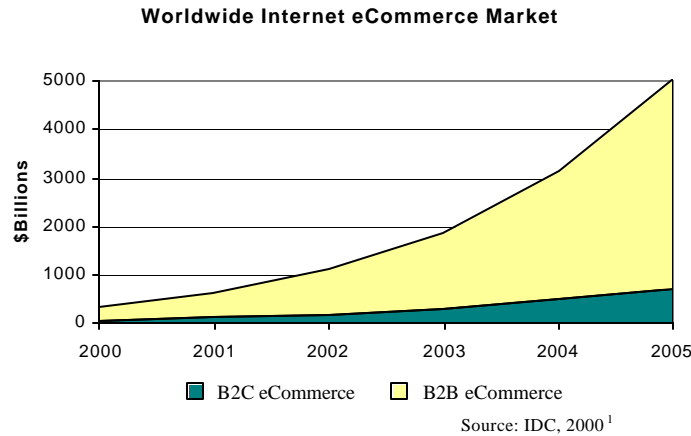
- *A clearly articulated business objective*  
Avnet's objectives were primarily driven by pressure from a key business partner, desires to increase internal operating efficiency and a corporate objective to implement multiple RosettaNet processes with one supplier. Other objectives were to assure competitive parity and enabling new technologies.
- *A dedicated cross-functional team with the appropriate skills and executive support*  
The cross-functional implementation team included executive support, program management, business process resources, system development resources, and third party provider resources.
- *Adequate attention to technology integration, systems testing and performance measurement*  
Multiple systems were affected by this implementation, and Avnet learned that end-users should be involved early, performance measures should be considered, many questions should be asked for new standards, and the integration impact of external systems should be carefully considered.
- *A detailed project plan and effective communications*  
Avnet developed and followed a carefully crafted project plan, and utilized multiple project management tools along the way.

### *Trends and future developments*

Trends and future developments in e-commerce process standards and their adoption are briefly discussed in the context of the case.

# 1. Introduction

The worldwide market for business to business transactions remains the fastest growing segment of e-commerce, and that growth is expected to continue over the next several years to reach \$4.3 trillion by 2005 according to IDC.<sup>1</sup>



Over the past ten years businesses have dedicated significant resources to building proprietary Electronic Data Interchanges (EDIs) and Value Added Networks (VANs) to streamline and speed communications with their partners. In fact, although the benefits from integrated supply chain management (SCM) vary, they can be significant and are well documented in previous studies.

### Supply Chain Operation

- Total supply-chain costs
- Order fulfillment cycle time
- Inventory holding
- Forecast accuracy

### Typical Benefits from Integrated SCM<sup>2</sup>

- 25% – 50% Reduction
- 30% – 50% Improvement
- 25% – 60% Reduction
- 25% – 80% Increase

Recently, the introduction of the Internet and Web-based communications has led to the development of new applications that are an attractive alternative to existing EDIs and VANs. These alternative, Web-based applications bring with them an opportunity to develop new communication standards that can be used within an entire industry, and even across industries. RosettaNet is pioneering the development of such standards for many industry-wide business processes, and Avnet, Inc. is a high-tech industry forerunner in implementing these new standards with its strategic partners. Companies such as Intel, IBM, Hewlett-Packard, Cisco, 3Com, Dell, Nokia, and many of their trading partners have also announced initiatives to adopt RosettaNet's Web-based open industry standards for many e-commerce processes. In fact, RosettaNet's Chief Executive, Jennifer Hamilton, notes that although "the most significant benefits are hard to quantify at this point..., there's an opportunity between 2% and 10% of revenue. [Since] RosettaNet's board members represent over \$1 trillion in supply-chain revenue, that's several tens of billions of dollars of opportunity."<sup>3</sup>

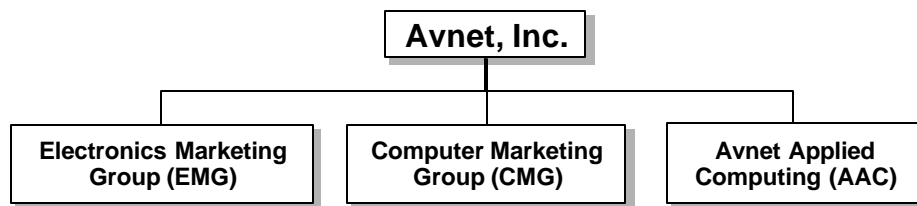
- ➔ This case study examines Avnet's implementation of three RosettaNet Partner Interface Processes with one of the largest suppliers to its Computer Marketing Group. Throughout this project Avnet recognized that success depended on an implementation process that addressed multiple transformation complexities. To do this, Avnet
  - Identified and articulated the project's business objective
  - Dedicated appropriate skill sets to a cross-functional team and provided executive support
  - Gave substantial attention to technology integration, systems testing, performance measures and organizational impacts
  - Followed a detailed project plan
  - Communicated effectively.

Of course, the implementation itself is only half of the story. Strategic change initiatives go hand-in-hand with noticeable benefits. For this project, benefits have been realized from several perspectives, including

- *Process* benefits from eliminating redundant activities, eliminating manual data entry, and automating information processing
- *Financial* benefits from streamlining processes, reducing cycle time, and increasing data accuracy
- *Business development* benefits from increasing connectivity with a key supplier, partnering with a key supplier, and increasing responsiveness to customers.

## 2. Background

**Avnet, Inc.** ([www.avnet.com](http://www.avnet.com)), a Fortune 300 company based in Phoenix, Arizona, is one of the world's largest distributors of semiconductors, interconnect, passive and electromechanical components, and computer products from leading manufacturers. Serving customers in 63 countries, Avnet markets, inventories and adds value to the products it distributes, and also provides world-class supply-chain management and engineering design services. With sales exceeding \$9.1 billion in FY2000, Avnet is strategically organized around three core groups; the Electronics Marketing Group (EMG), the Computer Marketing Group (CMG), and Avnet Applied Computing (AAC).



As part of its distribution activities, Avnet customizes products to meet individual customer specifications, and it provides material management and logistic services.

**RosettaNet** ([www.rosettanel.org](http://www.rosettanel.org)) is a self-funded, not-for-profit consortium of major information technology, electronic components and semiconductor manufacturing companies working to create and implement industry-wide, open e-business process standards. These standards form a common e-business language, aligning processes between supply chain partners on a global basis.

RosettaNet Partner Interface Processes (PIPs) define business processes between supply-chain partners, providing the models and documents for the implementation of standards. PIPs are organized into eight clusters that define processes for

- |                                       |                                    |
|---------------------------------------|------------------------------------|
| • RosettaNet support                  | • Inventory management             |
| • Partner, product and service review | • Marketing information management |
| • Product information                 | • Service and support              |
| • Order management                    | • Manufacturing                    |

### *Case study focus*

This case study examines Avnet's implementation of three PIPs from RosettaNet's Order Management Cluster with one of the CMG's largest suppliers of computer equipment. Between February and July, 2000 Avnet implemented RosettaNet's Purchase Order Management Process (PIP 3A4), Purchase Order Status Process (PIP 3A6), and Advance Ship Notification Process (PIP 3B2). The strategic change initiative began with defining the business objective and a detailed project plan, was led by a team with strong cross-functional skills, and required significant technology transformation, systems integration and organizational change. In fact, PIP 3B2 was actually created by the implementation team because there was no existing RosettaNet process standard that met Avnet's business objective.

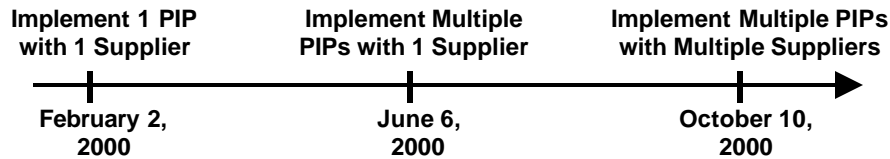
The benefits realized by implementing the three PIPs are multi-dimensional, and include reduced costs, reduced purchase order processing time, reduced head-count, streamlined processes, eliminated manual activities, and a stronger team environment.

### 3. Situation at Avnet

The decision to implement RosettaNet process standards was driven by both internal and external business objectives. Once that decision was made, there were still implementation complications and questions that needed to be answered before the team could begin its task.

#### 3.1 Avnet’s internally driven business objective

Early in 2000 Avnet, as a RosettaNet organization member with Board of Director level representation, had committed to specific process implementation goals according to the following timeline



These business objectives were clearly communicated and Avnet had already chosen the supplier to help achieve the February 2 objective. Now the challenge was to choose a supplier to meet the June 6 objective where multiple processes would be implemented.

#### 3.2 Avnet’s externally (supplier) driven business objective

At the same time, Avnet’s CMG was considering the technology transformations required to meet the needs of a new business model being adopted by one of its major suppliers of computer equipment. This supplier chose to shift from the traditional model, in which Avnet received customer orders, managed customer relationships, managed inventory, performed product integration, and managed shipping and outbound logistics. In the new model, Avnet still received customer orders and managed customer relationships, but then initiated purchase orders (POs) to the supplier for finished goods. In this way the supplier assumed responsibility for managing inventory, performing product integration, and managing shipping and outbound logistics. The business model transformation is summarized below.

	Traditional “Value Added Reseller” Model			New “Fee for Service” Model	
Responsibility	Avnet	Supplier		Avnet	Supplier
Manage customer relationships	✓		➔	✓	
Take customer orders	✓			✓	
Manage inventory	✓				✓
Perform product integration	✓				✓
Handle outbound logistics	✓				✓
Track customer orders	✓			✓	
Invoice Customers	✓			✓	

Another change that accompanied the shift to this new business model was a reduction in the number of customer relationship managers for the supplier (former value-added resellers) from 18 to 2, such that Avnet became one of only two strategic partners with the supplier.

#### 3.3 RosettaNet decision

Implementing three PIPs from RosettaNet’s order management cluster met the shared business objective for Avnet and its supplier to transact and communicate using a streamlined, standardized, Web-based approach. The project also aimed to help Avnet meet its own internal goal of implementing multiple PIPs at one supplier by June, 2000. Avnet and its supplier jointly chose to implement the same standards simultaneously.

### 3.4 Process implementation complications

Complications included integration issues with a new bill-of-material (BoM) configuration and quoting tool being developed by the supplier (for use by Avnet and other customers). The implementation was further complicated by the newness of Web-based standards; that is, ambiguous and untested standards resulted in multiple interpretations in some cases and, in others, new standard definitions .

### 3.5 Key questions that the implementation team faced

When Avnet undertook the implementation, the team that faced the challenge found itself asking a number of key questions.

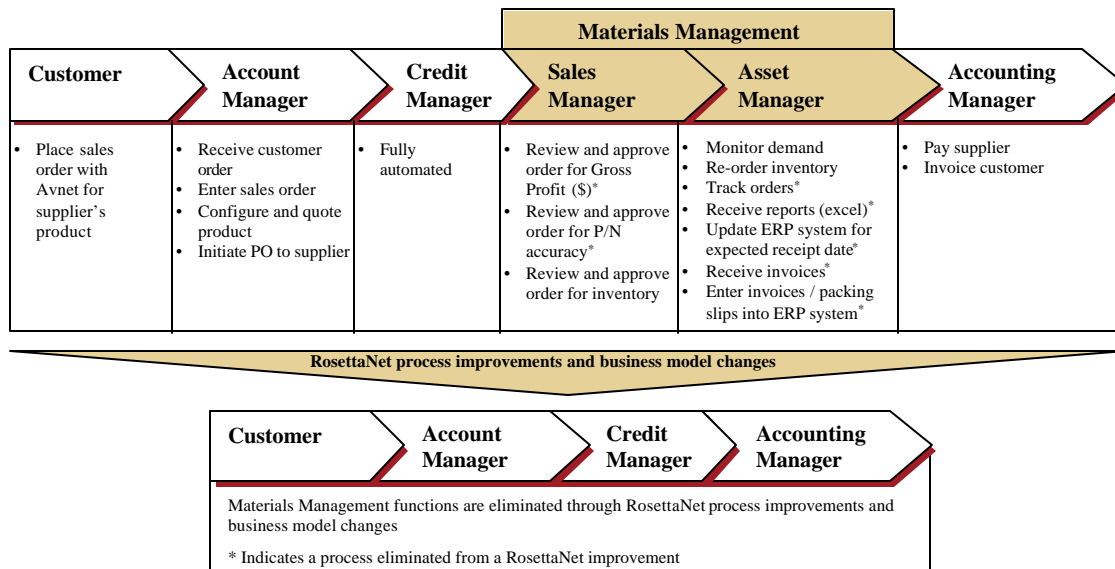
- What processes could be improved and what were the accompanying benefits?
- What were the financial benefits of the project?
- What process should Avnet follow to implement the RosettaNet PIPs in this complex environment and what are the critical success factors for a successful implementation?

The answers to these questions form the remaining focus of this case study.

## 4. Benefits from Process Improvements

Benefits that accompany the implementation of RosettaNet PIPs are expected to be greatest where the new process standards replace inefficient, manually intensive, slow legacy systems. In Avnet’s case, a reasonably efficient EDI system had already been developed with the CMG supplier, so many efficiencies in the order management process had already been realized. Some of these efficiencies include the elimination of complex forms and paper documents, the reduction of repetitive and non-value added tasks, the introduction of some standard processes, and other benefits that typically accompany EDI systems.

The implementation of three PIPs at Avnet’s CMG, combined with the same processes being implemented at one of the largest suppliers to CMG, resulted in significant benefits despite the preexistence of an EDI system. In examining the process improvements, it is useful to first understand the pre-existing order management process flow and the improved, industry-standard process flow. Both are shown below.



Efficiencies gained from the process reengineering helped eliminate nearly all the PO related functions of the Materials Management Group, and greatly streamlined the order tracking tasks of the Account Managers. Although these benefits could have been realized from enhancements to the preexisting EDI system, that implementation effort would not have allowed Avnet to connect directly to its supplier in a real-time fashion. Instead, it required the continued use of a third-party VAN. Because open, Web-based

standards were adopted, Avnet is now positioned to capture similar benefits on future projects from its newly enabled technology.

*“Adding another factory drop-ship supplier would require very little effort by the Avnet team because most of the required systems and process standards are already in place to do so.”*

- Business process owner

The specific benefits gained from the process improvements are discussed next.

#### ***4.1 Eliminated manual activities***

Although Avnet’s CMG was already running a proprietary EDI with its supplier, the order management process standards allowed for the elimination of a few remaining manual activities.

- *Checking of PO accuracy and gross profitability was eliminated*

Prior to the adoption of Web-based process standards at Avnet, the PO initiation process was not real-time and Account Managers could initiate sales orders without the necessary information to complete a PO, in which case Materials Managers would identify and gather the missing information. Now, with PIP 3A4, Account Managers input all the data required for a PO up-front in their sales orders and there is no need for the Materials Management Group to later check for accuracy and completeness. The new process is faster, more automated, more accurate and less expensive, so that part of the Materials Management Group was re-deployed to other areas. The cost savings are quantified in Section 5.

- *Manual re-keying of order shipment confirmations and order status updates was eliminated*

Previously, order status reports received by Avnet from the supplier were manually re-keyed into Avnet’s ERP system by the Materials Management Group. Now, with PIP 3A6 and 3B2, order status and shipment confirmation are sent electronically from the supplier and systems are automatically updated. As a result, processing efficiency and data accuracy increased while processing time and cost decreased, so that some resources in the Materials Management Group were re-deployed to other areas. The cost savings are quantified in Section 5.

- *Manual intervention in handling PO exceptions was significantly reduced*

Without Web-based standards, the Materials Management Group at Avnet received PO exceptions, determined their disposition, and forwarded them to the appropriate Account Manager. Now many exceptions are handled automatically and corrected before the PO is sent to the supplier, and rejected POs are automatically routed back to the Account Managers that initiated them. This process improvement reduced the total number of PO exceptions, decreased the time and cost to resolve the remaining PO exceptions, and allowed some resources in the Materials Management Group to be re-deployed to other areas.

#### ***4.2 Streamlined information flow and increased visibility to information***

Along with eliminating some manual activities, the use of Web-based process standards improved order management by streamlining information flow and increasing the visibility of information to supply chain stakeholders.

- *Information is more visible in the new system*

Prior to the adoption of RosettaNet process standards at Avnet, customers obtained order status directly from their Account Manager and status accuracy depended on slow, manual data entry. Now, with PIP 3A6, customers view the status of their orders at Avnet’s supplier through an accurate and automatically updated online system. Potential problems can be identified and resolved earlier. Because order status information is more available and more

visible, Account Managers no longer need to closely follow order progress or respond to customer inquiries directly, their overall workload is reduced, and they can focus on tasks that add higher value. The ultimate result is a more timely, more accurate, and less costly order tracking process and more productive Account Managers.

*“[C]ustomers have already said they are very pleased to have online access to information that tells them how the supplier is progressing on the construction phase of an order.”*

- System development specialist

- *Streamlined data flows accurately and more quickly*

Without RosettaNet standards, the supplier’s order shipment confirmations were received by Avnet and later manually re-keyed into the ERP system, triggering customer invoicing and revenue recognition. With the creation of the Advanced Ship Notification PIP 3B2, invoicing and revenue recognition can be automated and performed earlier since a text file from the supplier feeds directly into Avnet’s ERP system. This study estimates that the time between order shipment and customer invoicing has been reduced by three days, resulting in a quantifiable financial benefit (discussed in Section 5) -- provided customers are instructed to pay three days earlier.

With PIP 3A4, the supply chain activities that occur between the sales order initiation by Account Managers (Avnet taking customer orders) and the receipt of PO information (supplier receiving Avnet orders) are also closer to real-time and POs are not sent in batch-form as in the old EDI system. This study estimates that the time for PO processing has been reduced by one day, resulting in a quantifiable financial benefit from reduced inventory carrying costs. Of course, when POs are processed sooner product integration can begin earlier, overall product cycle time is reduced, and customers receive finished goods more quickly. When customers receive goods more quickly, customer satisfaction increases -- and there is potential for increased revenue from follow-on sales.

#### **4.3 Standardized data content and format**

During implementation, the availability of standards allowed Avnet and its supplier to quickly implement the new order management processes. Since the standards had already been created, teams could focus exclusively on implementation.

The standards also helped improve business processes. Account Managers now spend much less time correcting sales order information. Equally important is that fewer orders are returned for correction because the data required is standardized and consistent for every order. The result is time saved for Account Managers. Finally, by working with an industry standard, a framework can be constructed for upgrading to improved process standards as they develop.

## **5. Quantified Financial Benefits**

Benefits that accompany the implementation of Web-based process standards are expected to be greatest where the new processes are used to replace inefficient, manually intensive and slow legacy systems. In Avnet’s case, a reasonably efficient EDI system had already been developed. Still, the financial benefits are substantial.

### **5.1 Non-recurring startup costs of the implementation**

The implementation of Web-based process standards required the efforts of a startup team whose membership included system development resources, business process resources and skills from webMethods. Hardware and software costs were also incurred during the implementation, but now that the technology infrastructure has been established, future projects will avoid similar startup costs. The specific skills required, and the associated costs over a five-year period, are summarized below. Since the project was completed in 2000, startup costs in subsequent years are zero.

Non-Recurring Costs (\$000's)	Case with RosettaNet Implemented in 2000				
	2000	2001	2002	2003	2004
<b>Personnel Costs</b>					
<b>System Development Resources - RosettaNet</b>	256	0	0	0	0
Technical Consultants and Contractors					
Project Director and Coordinator					
EDI Specialist					
<b>System Development Resources - ERP System</b>	89	0	0	0	0
IT Project Manager, Consultant and Developer					
<b>Business Process Resources</b>	43	0	0	0	0
Business Process Owner					
Account Managers and Materials Managers					
<b>Technology Costs (Hardware and Software)</b>	486	0	0	0	0
<b>Non-Recurring Costs Sub-Total</b>	<b>875</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

### 5.2 Recurring costs for the theoretical baseline case and for the RosettaNet implementation

Recurring operational costs for the theoretical baseline case (in which RosettaNet is not implemented) are compared with the recurring costs that arise in the actual case (in which RosettaNet has been implemented). Both cases require systems development resources, business process owners, account managers, hardware resources, and software resources. Materials managers are not required in the RosettaNet case because their manual activities are eliminated or replaced with automated processes. The skills required and the associated costs over a five-year period are summarized below for both cases.

Recurring Costs (\$000's)	Case with RosettaNet Implemented in 2000					Case without RosettaNet Implemented				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
<b>Personnel Costs</b>										
<b>System Development Resources - RosettaNet</b>	10	11	11	12	12	10	11	11	12	12
ISD Developer										
<b>Business Process Resources</b>	3,086	2,270	2,361	2,455	2,553	3,422	3,148	3,274	3,405	3,541
Business Process Owner										
Account Managers and Materials Managers										
<b>Technology Maintenance Costs</b>	42	86	90	93	97	0	0	0	0	0
Hardware, software, third party										
<b>Recurring Cost Sub-Total</b>	<b>3,138</b>	<b>2,367</b>	<b>2,462</b>	<b>2,560</b>	<b>2,663</b>	<b>3,433</b>	<b>3,159</b>	<b>3,285</b>	<b>3,417</b>	<b>3,553</b>

Because this project did not result in the elimination of legacy EDI/VAN maintenance costs, those costs are not factored into this benefits analysis and are identical in both cases. The EDI/VAN is still required for Avnet's many other trading partners. Still, as more business transactions are conducted directly over the Internet, eventually there will be a cost avoidance from lower EDI/VAN use.

### 5.3 Net cost savings from implementing Web-based process standards

The total annual costs over a five-year period are calculated for each case (with and without the new standards implemented) by adding the recurring and non-recurring costs together.

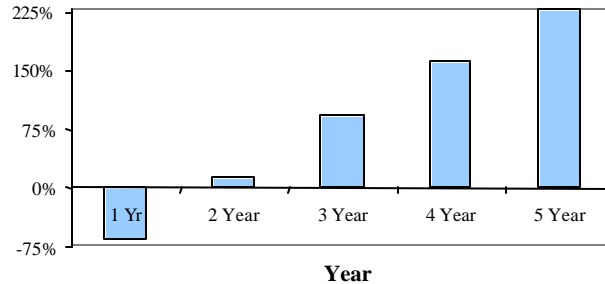
Total Costs (\$000's)	Case with RosettaNet Implemented in 2000					Case without RosettaNet Implemented				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
	4,013	2,367	2,462	2,560	2,663	3,433	3,159	3,285	3,417	3,553

The annual savings are derived by calculating the difference between costs in each case. A terminal value, where the savings in 2004 are extended in perpetuity, is also provided to illustrate that the financial benefits are magnified when they are captured over many years. However, the primary focus here is on the financial benefits over a five-year period, recognizing that process improvements from newly enabled technologies have limited life spans and are eventually upgraded or replaced as part of continuous improvement initiatives. The cost of capital is assumed to be 11% in the present value calculation.

Annual Cost Savings (\$000's)	2000	2001	2002	2003	2004	Terminal Savings Value (2002 Cost Savings Extended in Perpetuity)
		-580	792	823	856	
<b>Present Value of Annual Cost Savings (\$000's)</b>	<b>-580</b>	<b>713</b>	<b>668</b>	<b>626</b>	<b>587</b>	<b>5,334</b>

The Net Present Value (NPV) of the costs for both cases is also provided below, and assumes that the cost of capital is 11% in the NPV calculation. The present value of the cost savings over the five-year period is \$2 million, with the break-even return in the second year, 2001. The three-year return on investment (the startup costs subtracted from the recurring cost savings divided by the startup costs) is 92%, the five-year return on investment is 230%, and the ROI that includes a terminal value (where the savings in 2004 are extended in perpetuity) is 840%.

### ROI by Year



Even with the preexistence of an effective EDI, significant benefits resulted from implementing new process standards. These benefits might have been realized in a number of different ways, such as improvements to the existing EDI. However, the significant contribution of RosettaNet's prescribed standards to the success of this process improvement initiative should not be understated. Moreover, without a preexisting EDI/VAN in place, the benefits from implementing the order management processes would have been significantly greater.

#### 5.4 Other financial benefits

Although evaluating the personnel and technology costs is the most straightforward approach to valuing process reengineering projects, there are additional financial benefits that are not difficult to quantify and should be included in any benefits discussion. The details of these benefits and methods to quantify them are discussed below.

- *Interest income benefit from invoicing more quickly*

As stated earlier, Web-based standards allow Avnet to send invoices to customers three days sooner than in the former EDI system. Advanced shipment notifications are sent in real-time from the supplier and automatically posted to Avnet's ERP system. Previously, these notifications were sent via reports that required manual re-keying into the ERP system. By invoicing customers three days earlier, Avnet potentially benefits by recognizing revenue earlier and by collecting receivables sooner.

Although this study does not place a specific dollar value on the ability to invoice (three days) more quickly, quantifying the financial benefit is straightforward. If receivables are collected three days earlier, cash is made available to generate interest income or to invest with a theoretical return equal to the cost of capital (11%). That is, for a three-day decrease in the time it takes Avnet to invoice its customers the annual financial benefit is

$$\text{Annual Financial Benefit from Invoicing Sooner} = \text{Annual Invoice Volume (\$)} * \frac{3}{365} * \text{Cost of Capital (\%)}$$

With Avnet's FY2000 Annual Report citing CMG sales at \$1.9 billion, the potential benefit from invoicing more quickly (as a result of implementing Web-based standards with all of the CMG suppliers) could be substantial.

- *Inventory benefit from reducing PO processing time*

Previous discussion indicated that the Web-based standards allow Avnet to process its POs one day sooner than was possible in the former EDI system. POs are sent in real-time, acknowledgment receipt is automated and order confirmation must occur within 24 hours.

Because the PO processing time is reduced by a day, product integration can begin sooner and two financial benefits result. Although this study does not place a specific dollar value on reducing PO processing time by one day, quantifying the financial benefit is straightforward (described below).

First, finished products can be sent to customers a day sooner because the whole supply chain is more efficient. When customers receive products one day sooner they can be invoiced more quickly as well. In this way, the primary financial benefit from reducing PO processing time is identical to the benefit for invoicing more quickly -- except now the benefit is from only one day instead of three.

Second, either demand planning can use the “one day benefit” to more accurately forecast inventory replenishment, or the volume of on-hand inventory can be reduced by the equivalent of one day. In the first option, benefits from more accurate forecasts can come from fewer stock-out situations, fewer backlogged orders, and lower excess inventory on-hand. In the second option, where the volume of on-hand inventory is reduced by the equivalent of one day’s supply, the value of that inventory can be made available to meet other business needs. To quantify the benefit from a one-day inventory reduction, the following method can be used.

$$\text{Benefit from Reduced Inventory} = \text{Annual Inventory Volume (\$)} * \frac{1}{365}$$

This value could be invested with an annual return equal to the cost of capital (11%), as described earlier. Also, benefits will be different where the inventory management environment is managed Just in Time (JIT). Of course, in the new business model described earlier, the supplier has taken on responsibility for inventory management, so the supplier realizes this benefit rather than Avnet directly.

Finally, with Avnet’s FY2000 Annual Report citing that the cost of sales is 86% of sales, and knowing that the CMG sales are \$1.9 billion, substantial benefits could result from reducing inventory by implementing Web-based standards with all CMG suppliers.

## 6. Critical Success Factors for Web-Based Process Implementation

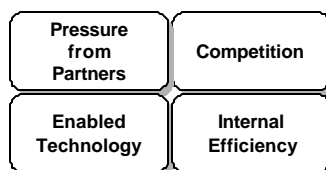
From information gathered during a series of interviews with the RosettaNet PIP implementation stakeholders, including system developers and process owners, it is clear that implementation success for the team depended on a set of critical success factors (CSFs). By managing only a few CSFs for this strategic change project, Avnet successfully implemented three RosettaNet PIPs with one supplier. Although the implementation team did not explicitly organize its activities around the CSFs described here, it is clear that these factors were skillfully managed to varying degrees through the course of the project.

### 6.1 A clearly articulated business objective

*“It was critical that executive level support was committed early so that everyone knew the importance of this project for Avnet’s business. Even after the team had been established and empowered, that support continued and helped remove roadblocks for the team along the way.”*

- System development specialist

Strategic change initiatives should always align with clear business objectives, and Avnet’s implementation of RosettaNet standards was no exception. This project involved dramatically improving existing processes, and the business objective came from the following set of drivers.



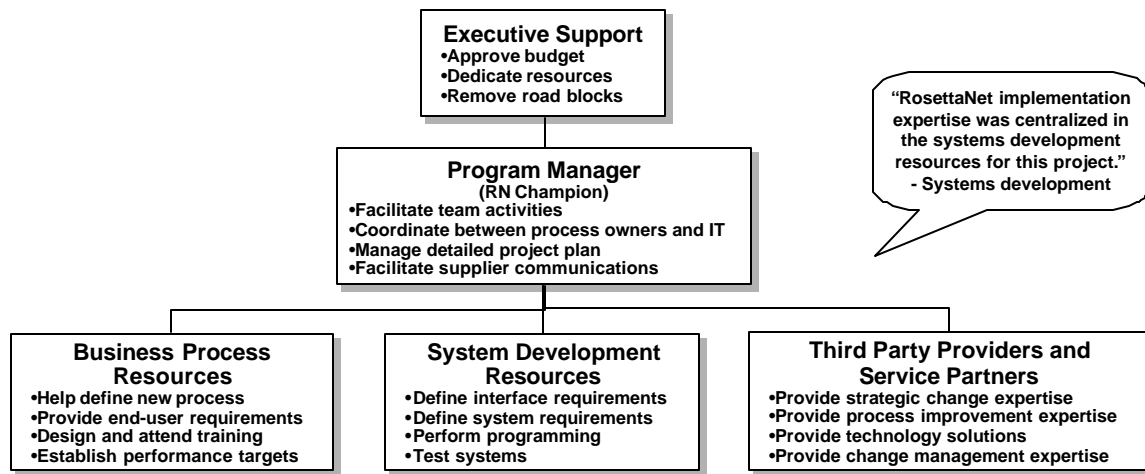
Preferences of a key business partner, the supplier to CMG, played a strong role in the decision to implement RosettaNet standards. At the same time, Avnet had previously established internal objectives for being an industry leader in implementing RosettaNet standards. The goal was to stay ahead of its competition and benefit from internal efficiencies early. RosettaNet as a technology enabler was also a business driver, but to a lesser extent because of the pre-existing EDI with this particular supplier. Avnet clearly had multiple business objectives that all pushed the organization in the direction of implementing RosettaNet's Web-based standards.

**6.2 A dedicated cross-functional team with the appropriate skills and executive support**

*“During the testing phase the team would hold two conference calls each day; the first to set the day’s objectives and the second to identify and close-out issues. With the team’s cross-functional skills focusing on the same topic at the same time, most issues were identified early and resolved with minimal complication.”*

- Implementation team manager

Avnet chose to follow a well-proven cross-functional organization structure for the project team. The general structure of the organization, with individual responsibilities, is provided below.



Yet every project is different. When it tailored this team structure to the actual implementation, Avnet adopted leading industry practices:

- Executive support was deeply committed to the project’s business objectives
- The program manager was dedicated to the project full-time to minimize conflicts with other tasks
- Business leaders were involved early to define optimized processes and leverage experience from the pre-existing EDI system
- System developers had deep expertise from a previous implementation, experience in xml programming, full knowledge of the ERP system, and the ability to integrate and test systems
- Adequate training was developed and enough time was allowed for its delivery
- The third-party technology solution (middleware) and consultant provider were carefully chosen using pre-defined selection criteria

The attention given to selecting the third-party provider was significant. Avnet followed elements of the structured selection process outlined below.

Identify and Screen Candidate Pool	Gather Candidate Information	Apply Decision Criteria and Choose Third Party Provider
<ul style="list-style-type: none"> <li>• Develop critical success factors and wish list</li> <li>• Identify detailed requirements</li> <li>• Understand pricing options</li> <li>• Analyze gaps between services offered by candidate and critical success factors</li> </ul>	<ul style="list-style-type: none"> <li>• Request information</li> <li>• Ask follow-on questions</li> <li>• Develop evaluation and decision criteria</li> <li>• Gather cost information</li> <li>• Learn negotiation levers</li> </ul>	<ul style="list-style-type: none"> <li>• Consider IT systems and integration requirements</li> <li>• Review evaluation results</li> <li>• Coordinate with ERP requirements</li> </ul>

With the information provided by each third-party provider candidate, their offerings could be evaluated against specific criteria. A simple comparative evaluation framework is provided below, but such evaluations of potential third-party providers often employ more sophisticated frameworks that include factors and weights.

Evaluation Characteristic	Potential Third Party Suppliers			
	Candidate 1	Candidate 2	Candidate 3	webMethods
RosettaNet experience				
Industry dominance				
Strength handling private processes				
Experience with existing infrastructure				
Breadth and quality of of services				

Capability Relative to Peers

- Strong
- ◐ Moderate
- Weak

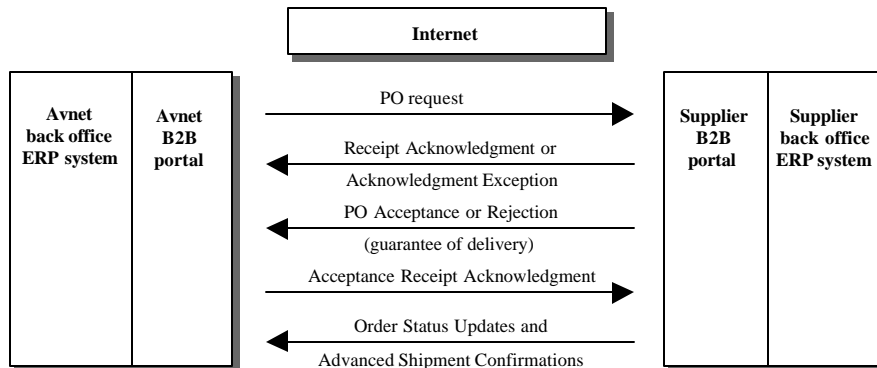
Once the candidates were identified, evaluation criteria established, and candidates ranked according to their capabilities relative to peers, selection proceeded smoothly. webMethods (www.webmethods.com) was ultimately selected to provide middleware software and a technical consultant.

### 6.3 Adequate attention to technology integration, systems testing and performance measurement

*“The supplier provided the initial requirements and connectivity. Still, with standards that had been so recently developed, it was important to ask questions around interpreting the standards before they were implemented to develop agreement and clarification. Different interpretations of the same standard led to connectivity difficulty in a few isolated circumstances.”*

- System development specialist

Integration issues arose most often in connectivity with Avnet’s supplier. Avnet occasionally had difficulty connecting to the supplier, data was sometimes lost during transmission, and the supplier’s systems initially failed to respond to PO transmissions. As indicated below, this complex problem affected multiple systems.



Even though Avnet was highly successful in implementing its systems integration and testing plan, there were some lessons learned that the team carries forward into future efforts. These lessons span six key strategic elements of a broad approach to develop B2B connectivity with trading partners.

Actions	Strategic Elements	Learning from Implementation	Comments from the Implementation Team
<b>Plan Change Strategically</b>	1 Develop an integrated strategy - Business strategy - Process approach - Technology planning	⇨ Align the implementation of standard processes with broader business model changes ⇨ Integrate with corporate approach to legacy ERP and EDI systems, while considering effects on end-users	<i>“Implementing order management process standards in conjunction with adopting an entirely new business model required both initiatives to be aligned and mutually supportive.”</i> - Business Process Owner
	2 Engage business and technology groups - Involve business process owners - Include technology experts - Provide cross-functional team leadership	⇨ Utilize cross-functional team with executive support, dedicated program management, business process owners and technical experts ⇨ Involve business process owners and end-users early in defining improved processes and systems testing	<i>“The Account Managers were creative and came up with input data that disrupted the system even after the implementation team had considered all likely scenarios.”</i> - Business Process Owner
<b>Assure Stakeholder Value and Buy-in</b>	3 Engage trading partners - Define partner needs - Assure partner change-readiness - Develop buy -in	⇨ Work closely with trading partners and anticipate systems integration issues with them ⇨ Consider the integration impact of external, partner controlled systems on project plans and milestones	<i>“The supplier had complex firewall configurations where the sending servers were different from the receiving servers. There was a possibility for the supplier’s system to send an acknowledgment back to us without forwarding the message on to their back-end ERP system. On another occasion the Avnet system did not closedown open threads, which was quickly corrected.”</i> - System development specialist
	4 Develop business value - Target processes with highest impact - Estimate implementation costs - Quantify business benefits	⇨ Use ROI framework to build the case for change in other business units and for additional processes ⇨ Target inefficient, manually intensive, slow legacy processes for the highest financial benefit ⇨ Develop performance measures to assure benefits realization	<i>“Without a rigorous benefit analysis, weighing the implementation costs against the process improvement benefits would not have been possible.”</i> - Business Process Owner
<b>Execute Effectively</b>	5 Link internally - ERP and back-office systems - Front-end interfaces - End-users	⇨ Develop specialized interfaces between front-end and the back-office ERP system ⇨ Limit process functionality where business impact is low and implementation difficulty is high ⇨ Develop systems for leverage toward follow-on projects	<i>“The ability to change or cancel a PO was not implemented and still requires manual intervention. Also, supplier part numbers were used instead of the RosettaNet GTIN part number scheme, and DUNS were only used selectively to identify other partners (but not every ship-to customer).”</i> - System development specialist
	6 Take action - Costs decrease with experience - Ask challenging questions - Leverage learning	⇨ Ask many questions around new standards (optional data fields can be used in different ways with different suppliers, time between process revisions is shorter now than it will be in the future, some standards can have alternative interpretations, and vagueness will lessen as standards mature)	<i>“In one circumstance, the standard specified that PO Acceptance needed to be received by Avnet within 24 hours. It also specified that three re-tries were permissible for the transmission. Initially, there was some confusion as to whether the 24 hour requirement applied to the whole operation, or only from the last transmission attempt, in which case a total of 72 hours was possible before acceptance receipt.”</i> - System development specialist

Avnet also chose to limit some functionality where the implementation difficulty was high and the business objective impact was low. For example, the ability to change or cancel a PO was not implemented and still requires manual intervention. Also, supplier part numbers were used instead of the RosettaNet GTIN part number scheme, and DUNS were only used selectively to identify other partners (but not every ship-to customer).

Establishing meaningful performance measures and setting appropriate targets was not left as an afterthought by the team. The team worked to proactively develop multiple measures, which include:

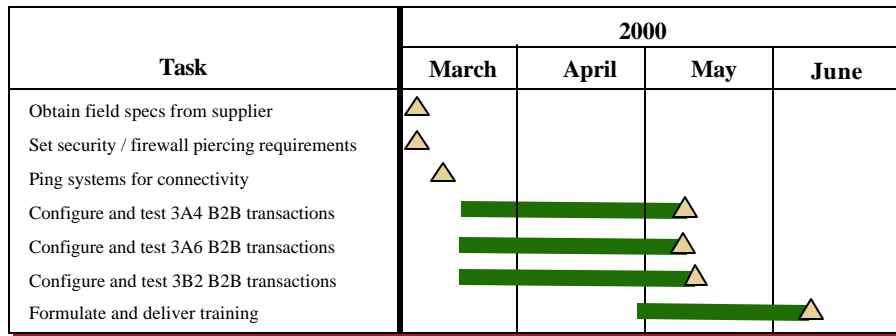
- Automated monitoring of on-time delivery misses and open orders that are past-due
- Supplier reporting of “dirty orders” and tracking of reasons for inadequate data in transmitted POs
- Real-time data checks prior to sending, where the ERP system cannot forward messages without the appropriate information

**6.4 A detailed project plan and effective communications**

*“Weekly meetings, conference calls and project plans were all very helpful to the implementation team. Everyone knew that the most recent version of virtually any document could be obtained from the team Web site, so no one ever needed to work with information that was outdated.”*

- Implementation team manager

A detailed project plan was created and several other project management tools were utilized. A high-level project plan is illustrated below.



Other project management tools include

- Project milestone maps, change management plans and transition plans
- Conference calls, team meetings, meeting minutes and a team Web site
- Issue logs, exceptions reports, spotlight status reports, resolution tracking and test case tracking
- Process maps and technology connectivity maps
- Statements of work, requests for proposals, business requirements documents and functional requirements documents

As a result of the newness of the Web-based standards, the team learned quickly to question standards when appropriate and to work with RosettaNet when necessary while staying within the boundaries of the overall project plan.

*“In one instance, we learned that the standard did not have an entry for a PO number, which required making changes to the standard with RosettaNet that were not originally in the project plan.”*

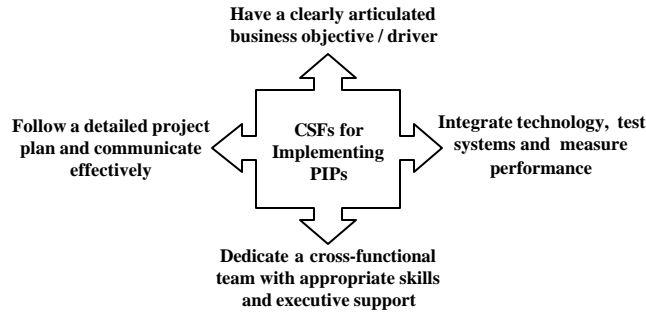
- System development specialist

Another success that the implementation claims is the creation of PIP 3B2, the Advance Ship Notification Process. This process was created because there were no existing RosettaNet process standards at the time that met Avnet’s business objective. While the creation of this process eventually led to a significant reduction in manual re-keying of shipment confirmations, it also required a significant amount of effort that was made possible because the team carefully managed its project plan and accurately mapped its implementation course.

## 7. Closure

Implementing the RosettaNet PIPs, 3A4, 3A6 and 3B2, is a significant milestone for Avnet that demonstrates the effective use of industry-wide Web-based standards. Creating the customized PIP, 3B2, demonstrates that a structured implementation can be flexible and can meet challenges in creative ways. The need to create that process, however, also highlights the fact that Web-based process standards are new, evolving quickly, and leave some gaps between defined standards and comprehensive industry requirements.

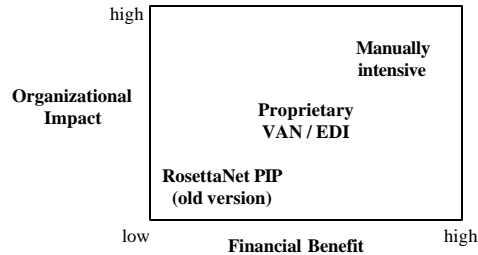
Avnet has shown that implementing multiple standards with one supplier is a complex task that requires dedicated resources, specialized skills, and skilled management of multiple critical success factors (CSFs).



Successful teaming across departments at Avnet and between participating companies created efficiencies in the implementation. Teaming also led to cross-training so that now each team member can be more effective in their ongoing activities.

Clearly, benefits from adopting RosettaNet standards can be quantified and, in the case of Avnet’s CMG, the ROI for the project over a five year period is 230%. Of course, the benefits from implementing RosettaNet standards in other areas will vary depending on the specific PIP and the efficiency of the preexisting system.

### Preexisting System Characteristics and the Effect of Replacing them with New Process Standards



Future initiatives at Avnet are likely to focus on implementing new and more complex standards, widening the usage scope of standards already being used, and developing a framework for upgrading standards to current versions. Avnet has already begun to implement other more complex standards such as IT dictionaries, and is working toward greater compliance with the standards both in-house and at solution providers. Developing a PIP upgrade strategy is currently a high priority, and is uniquely challenging since upgrades may require coordinating simultaneous changes with the affected trading partner(s).

RosettaNet standards are certainly not the only alternative available in the high-tech industry, so it is conceivable that multiple process standards will coexist alongside legacy EDI processes for many years. Still, as RosettaNet standards mature and become accepted by more industry stakeholders, their advantages are expected to increase. Areas where RosettaNet standards can be expected to develop in the near future include:

- ***Interoperability improvements***  
In their current form, many RosettaNet PIPs can be implemented in more than one way between different partners because of differing interpretations, imprecise definitions, and differing uses of optional data fields. Avnet and its supplier encountered several questions that the new standards left unanswered and vagueness that left room for differing interpretations of the same standard. Standards that were adopted also required supplier-specific customizations, so that a later implementation of the same standard with a different supplier will only leverage some of the original work. This problem should decrease in the future.
- ***Stabilization of revisions***  
The time between PIP revisions and the number of changes in each revision should stabilize quickly. Until then, firms should work to implement PIPs that are simple, more mature, and address problematic areas with strategic partners. Efforts should be made to replace the most inefficient, manually intensive, and slow legacy systems with more effective, standard processes and systems.
- ***Knowledge sharing***  
When industry-wide standards are adopted in cases like RosettaNet, the whole industry benefits from lower costs, higher quality information and decreased processing time. Industry followers are expected to take the lead and learn from the early adopters of the standards. In fact, those early adopters have already begun to share their experiences and lessons to expedite the adoption rate of RosettaNet process standards.

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## Contact Information

PricewaterhouseCoopers is available and interested in discussing this case study, as well as how benefits realization and managed change applies to your organization and its business-critical initiatives. Avnet also welcomes inquiries regarding this case study and other areas as well.

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