

The Frontiers of E-Procurement: RosettaNet Malaysia

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ABSTRACT

Since its inception three years ago, the euphoria and bandwagon of e-business has finally settled down. Despite the cooling of the dotcom hysteria, e-businesses have become focused and appear to have stepped effortlessly in the 21st century. This change in business structure and strategy is evident in the application of Web technology for the articulation of new business plans, to leverage business partnerships and improve customer service against the setting of a currently fragile economy. The research firm, International Data Corporation (IDC) forecasts have indicated that the Asian region will drop its hold on the worldwide e-commerce market from 25 percent in 2000 to 21 percent by 2003. So why has e-business not taken off as expected? One of the major obstacles is coming to an agreement on standards for online transactions. Thus this paper aims to highlight the significant role of RosettaNet, an Internet based common messaging standard for global supply chain management. Many countries in North America, Europe and Asia have adopted RosettaNet standards and have established their own organizations to facilitate standards collaboration and implementation. The Government decided to adopt RosettaNet for Malaysia in view of the increasing importance of Malaysia as a hub for many of electrical and electronic components. A board chaired by the International Trade and Industry Minister with representation from the public and private sectors manages RosettaNet Malaysia. (NST, 2001).

Keywords: e-procurement, strategic sourcing, RosettaNet Malaysia (RN Malaysia)

1.0 INTRODUCTION

1.1 RosettaNet Defined

RosettaNet is an independent, non-profit consortium dedicated to the collaborative development and rapid deployment of open Internet-based business standards that align processes within the global high-technology trading network. The consortium was officially launched on the 24th of January 2002. (NST, 2002). More than 400 companies representing over US\$1 trillion in annual information technology, electronic components and semiconductor manufacturing revenues currently participate in RosettaNet's standards development, strategy and implementation activities. Currently RosettaNet Malaysia 7th in the world after US, EU, Japan, Korea, Taiwan, Singapore. (RosettaNet, 2001)

The initiative was well received by the Malaysian government. In fact, the Prime Minister when tabling the 2002 Budget first introduced financial assistance by the Government under a RM5 million-grant fund available under the RosettaNet initiative. The grant was to be administered by Ministry of International Trade and Industry through the Small Medium Industry Development Corporation (Smidec). The

grant will cover costs of acquisition of RosettaNet middleware, firewalls, firmware and hardware, fees for system integration as well as membership and entrance fees to RosettaNet Malaysia Sdn. Bhd. Penang, Kedah and Perak, being the states with the highest concentration of electrical and electronic industries, will be the early beneficiaries of this financial assistance. (Miti, 2001).

1.2 What and why e-procurement?

In general, e-procurement or electronic procurement solutions use Internet technology to streamline, manage and report on the corporate purchasing function, and range from basic catalog access tools to systems that encompass the entire requisition-to-delivery process. Establishing an e-procurement solution involves implementing a software application tailored to a corporation's specific purchasing agreements, internal procedures and business rules. The application is accessible from the desktops of all employees via a standard Web browser, enabling a self-service purchasing environment that allows employees to select products and initiate orders 24 hours a day, seven days a week from anywhere in the world. (Cheddar, 2000).

According to the Meta Group, an IT consulting firm, e-procurement benefits fall into three distinct categories:

- **Correct Buying** - Buying the correct product or service from the correct supplier, at the correct price, at the correct time, and with the correct attributes.
- **Cheaper Buying** - A reduction in resources (time, capital and personnel) consumed in the processing/approving of requisitions.
- **Working Capital Reduction** - Elimination of excess inventories from existing stocks.

1.3 RosettaNet & e-procurement Synergy

An e-procurement strategy allows corporations to gain a much clearer picture of their overall buying tactics, initiate aggregate purchasing across multiple departments and offices, and dramatically shrink the number of vendors with whom they deal. In addition, companies can reduce "maverick buying," which is the purchase of goods and services that do not meet corporate standards or do not come from a list of approved suppliers. (Cheddar, 2000). The RosettaNet Malaysia encourages affordable solutions, which allows greater supply-chain customization and strategic sourcing between the SMI's in the electrical and electronic industry. Strategic sourcing refers to the process of determining what specific products or services to procure, from which supplier and for what price, and developing a mutually beneficial relationship with that supplier. Strategic sourcing and

procurement are natural partners - once this relationship is established, procurement becomes more efficient. (Da Rold, 2002).

According to Gartner Consulting group (2001), most of the initial software investments and development focus for a typical e-market would start out by buying transaction engines, catalog presentation, search tools, and software and services to make supplier catalog information available through the e-market database. This last item, making supplier catalogs available through the e-market can be an enormously complex and expensive undertaking that involves solving different conversion and translation problems for each supplier. The problems that were typically encounter include:

- Different suppliers organize their catalogs in different ways.
- The same term can mean different things across different catalogs.
- Product specifications are not handled the same way across different manufacturers.

(Gartner Consulting Group, 2001)

Therefore even if the information is available in electronic form, it is often organized only for creating printed pages or for on screen viewing, and not for use in parametric searching and databases. As such the only reliable reference point is a paper catalog. The complexity of these problems and the expense involved in solving them, repeatedly for each supplier have almost been accepted as a default in the lifecycle of supply-chain management. Hence RosettaNet, as an Internet based common messaging standard for global supply chain management has a significant role in addressing the problems mentioned above.

2.0 CURRENT CHALLENGES

2.1 Outsourcing to sustaining competitive edge for SATS

The 2001 market slump stirred up the SATS industry. For example, lower cost and local content are the primary objectives driving SATS companies to invest in and set up assembly plants in China. The downturn also resulted in an acceleration of the trend toward outsourcing. Most chip suppliers are outsourcing their back-end manufacturing, tapping outside help instead of investing in packaging assembly lines that may take years to show a return. The package service suppliers were more vertically integrated. Now they are performing both package design and assembly and are often providing package testing. (Koh, 2002)

China holds many attractions for semiconductor manufacturers. It has a well-educated population, an infrastructure that is fast becoming conducive to semiconductor manufacturing and low labor costs. The country is also an extremely large consumer, and internal consumption of semiconductors is rising exponentially. This all combines to make China a

most attractive country for expansion, particularly in the area of packaging assembly. (Da Rold, 2002). In recent years, the vast majority of foreign chip companies that have invested in China have put their money into IC packaging and testing operations. The most recent investment came from Fairchild Semiconductor, which announced in March it is ready to begin construction on a previously announced IC assembly and test plant in Suzhou. SATS companies such as Amkor, ASAT Holdings and ChipPac have also set up plants in China, taking advantage of the Mainland's growing demand for chips. Amkor has started volume production of a chippackaging and testing facility in Shanghai, with production destined for China's cellular phone market. The company is expanding manufacturing space to accommodate business forecast for the second half of 2002. (IDC, 2002). In this context, Penang is to emulate similar success to China. As Penang is Malaysia's "Silicon Island" the state is set to spearhead the country's role in the adoption of RosettaNet, owing to its high concentration of electronics and electrical companies and extensive linkages between multinational companies and local vendors in the northern region.

2.2 "On-boarding" at the outset of e-market growth

"On-boarding" refers to the process of engaging the participants in an e-market so that the latter achieves liquidity. (Zoelick, 2000). In the earliest stages of a market, on-boarding consists of securing engagement at the executive level of buying and selling organizations in order to receive high-level commitments to participate in the market. This kind of on-boarding might potentially involve the exchange of equity or warrants in return for conditional commitments to participate. On-boarding, like liquidity, happens in stages, and the stages match the progressively more complex definitions of liquidity. However on-boarding becomes increasingly demanding as the e-market begins operation and its quest for liquidity. This market 'dilemma' could be a potential source of concern for the RN Malaysia and its six other counterparts.

However Davenport (2001), argues that the early e-market consortium such as RosettaNet, would face difficulty in implementing information and process standards. On one hand it is easy to have various experts in an industry to agree on a common process standards. However it is another matter altogether for everybody in an industry to actually implement common information and processes as it would involve greater reengineering of businesses processes. It will be even harder for companies to agree on how to describe highly engineered or complex components. Even if these steps could be accomplished, there are undoubtedly dissidents within the organization that will say, "Why should we make all our processes and information the same as our competitors—so that we can compete only on price?". (Davenport, 2001) In short, the solution to

achieving a global supply-chain management lies not only on strategic e-business models and common process standards but also in developing long-term trading partners with whom they can cultivate trusting relationships.

3.0 STUDY CONDUCTED

The sample population for this research shall comprise of 96 medium and large enterprises in the e and e manufacturing sector registered with RN Malaysia based in Penang. A gap analysis will be conducted among the companies. In information technology, gap analysis is the study of the differences between two different information systems or applications, often for the purpose of determining how to get from one state to a new state. A gap is sometimes spoken of as "the space between where we are and where we want to be." Gap analysis is undertaken as a means of bridging that space. (TechTarget, 2001). Among the various

methodologies used to perform gap analysis is IDEF, a group of methods used to create a model of a system, analyze the model, create a model of a desired version of the system, and to aid in the transition from one to the other. IDEF (for *Integrated Definition*) is a group of modeling methods that can be used to describe operations in an enterprise. IDEF was created by the United States Air Force and was originally developed for the manufacturing environment. However since its inception, IDEF methods have been adapted for wider use and for software development in general.

The IDEF methods are used to create graphical representations of various systems, analyze the model, create a model of a desired version of the system, and to aid in the transition from one to the other. The following table lists the IDEF methods either current or in development. IDEF0 through IDEF4 are the methods most commonly used.

IDEF METHODS

- IDEF0 **Function Modeling**
- IDEF1 **Information Modeling**
- IDEF1X **Data Modeling**
- IDEF2 **Simulation Model Design**
- IDEF3 **Process Description Capture**
- IDEF4 **Object-Oriented Design**
- IDEF5 **Ontology Description Capture**
- IDEF6 **Design Rationale Capture**
- IDEF7 **Information System Auditing**
- IDEF8 **User Interface Modeling**
- IDEF9 **Scenario-Driven IS Design**
- IDEF10 **Implementation Architecture Modeling**
- IDEF11 **Information Artifact Modeling**
- IDEF12 **Organization Modeling**
- IDEF13 **Three Schema Mapping Design**
- IDEF14 **Network Design**

Source: TechTarget, 2001

For the purposes of this study, IDEF0 has been chosen to demonstrate the flow of supply-chain processes. The model would illustrate the functions of an enterprise, creating a graphical model that shows: what controls the function, who performs it, what resources are used in carrying it out, what it produces, and what relationships it has to other functions. The outcome of the gap analysis via IDEF0 would identify areas within the supply-chain process that could be consider for strategic sourcing with potential suppliers within the SMI e and e industry.

4.0 DATA FINDINGS AND ANALYSIS

The collection of data took the longest of the research period in approximately four and a half months. From the distribution of survey only 72 were considered complete and answered fully. In order to substantiate the findings, several interviews were also held among middle-section management either within the procurement or logistics sectors. The majority of the large companies such as Acer Technologies Sdn Bhd and Agilent Technologies Sdn Bhd were concentrated along the industrial zones in Penang, namely Bayan Lepas, Seberang Prai and Seberang Jaya. Nonetheless several trips had to made to Kuala Lumpur to ascertain more data and the consistency of common standards being used among the companies in procurement matters.

Industrial Area	Num of Companies	Profile
i) Bayan Lepas	55	<ul style="list-style-type: none"> • 40% joint venture ownership • 20% large enterprise • 40% heavy electronics based (e.g: semiconductor and wafer fabrication)
ii) Seberang Prai	24	<ul style="list-style-type: none"> • 75% Bumiputera ownership • mixture of medium to large enterprises • 50% based in assembly of electrical goods (e.g: radio, TV, cassette recorder)
iii) Seberang Jaya	17	<ul style="list-style-type: none"> • 59% Bumiputera ownership • concentration on household electrical appliances (such as refrigerators, fans, irons)

Table 1: Company Profiles

For each company, the survey focused on procurement processes and the routine logistics process. Among the main common problems cited by the companies were in standardization of common protocols and sequencing the time gap between productions especially with regards to any unforeseen contingencies such as delay in delivery of circuit boards or the handling of logistics. The problem is further exacerbated when companies utilized different operating systems and procurement of software protocols.

From the survey it also found that sixty five percent of the enterprises were assemblies sites and smaller branches. The main headquarters were based largely in America and Japan. The main problems arise in empowerment and deciding on ideal operating conditions. In cases of contingencies, the critical path analysis for a procedure would increase twofold, which proved to bear high transaction cost in time and money. Among the more costly business data entities can be seen in Table 2 below. Hence timeliness is of the essence.

BillingStatement	The collection of business properties that describe a financial statement for billing purposes.
BillofMaterialItem	The collection of business properties that describe an assembly, kit or single item. It may also be used to describe ""phantom"" parts.
BillofMaterialMarkUp	The collection of business properties that describe the nature and type of revisions to be made to a BillofMaterials.
CapabilityPeriod	The collection of business properties that describes the time period through which the manufacturing capability information is required.
ConsumptionProduct	The collection of business properties that describes material being consumed by customer.
DeliveryException	The collection of business properties which allows a Transport Service Provider to advise a consignee of delivery status exception reason and time.
EmbeddedForecastPeriodReference	The collection of business properties that describe various types of data ranges for an embedded forecast.

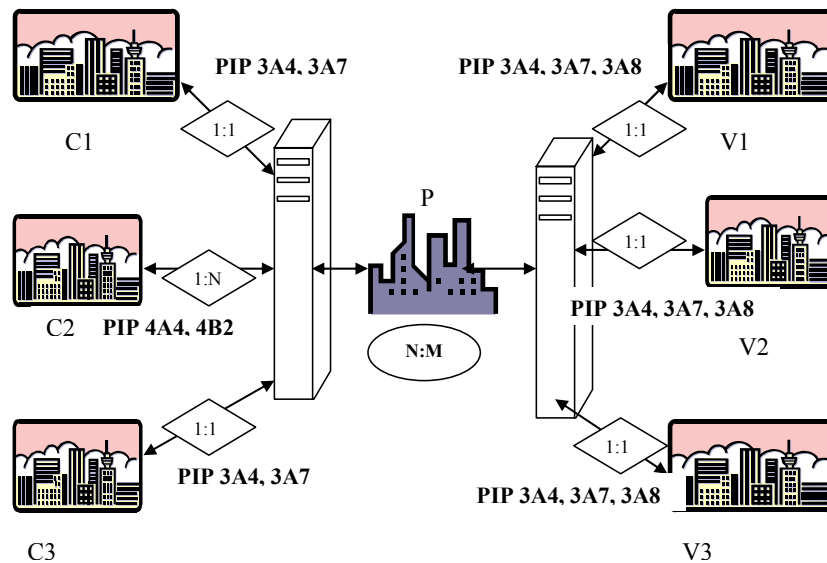
Table 2: High Transactional Cost Business Entities

- PIP 2A10: Distribute Design Engineering Information (Version V01.00.00 - In Production)
- PIP 2A12: Distribute Product Master (Version V01.03.00 - In Production)
- PIP 2A9: Query Technical Product Information (Version V01.01.01 - In Production)
- PIP 2C7: Request Bill Of Material (Version R01.00.00 – In Production)
- PIP 3A1: Request Quote (Version V02.00.00 - In Production)
- PIP 3A4: Request Purchase Order (Version V02.02.00 - In Production)
- PIP 3A6: Distribute Order Status (Version V02.00.00 - In Production)
- PIP 3A7: Notify of Purchase Order Update (Version V02.02.00 - In Production)
- PIP 3A8: Request Purchase Order Change (Version V01.02.00 - In Production)
- PIP 3A9: Request Purchase Order Cancellation (Version V01.01.00 - In Production)
- PIP 3B12: Request Shipping Order (Version V01.01.00 - In Production)
- PIP 3B13: Notify of Shipping Order Confirmation (Version V01.01.00 - In Production)
- PIP 3C3: Notify of Invoice (Version V01.01.00 - In Production)
- PIP 3C4: Notify of Invoice Reject (Version V01.00.00 - In Production)
- PIP 3C6: Notify of Remittance Advice (Version V01.00.00 - In Production)
- PIP 3C7: Notify of Self-Billing Invoice (Version V01.00.00 - In Production)
- PIP 4A5: Notify of Forecast Reply (Version V02.00.00 - In Production)
- PIP 4B2: Notify of Shipment Receipt (Version V01.00.00 - In Production)
- PIP 4B3: Notify of Consumption (Version R01.00.00 - Waiting Validation)
- PIP 4C1: Distribute Inventory Report (Version V02.03.00 - In Production)
- PIP 5C1: Distribute Product List (Version V01.00.00 - In Production)
- PIP 7B1: Distribute Work in Process (Version V01.00.00 - In Production)
- PIP 7B5: Notify Of Manufacturing Work Order (Version V01.00.00 - In Production)
- PIP 7B6: Work Order Change Notification (Version V01.00.00 - In Production)

In retrospect, only twenty-five percent of the companies have adopted the RosettaNet Partner Interface Process (PIP)s. The RN (PIP)s is a set of common protocol that defines each operating procedures throughout the entire procurement process. From the survey each of the twenty-five of the companies have adopted the PIPs in incremental stages. The more common protocols that has been adopted and used in their operating systems are as follows:

By applying the entity-relationship (E-R) within the IDEF modeling method, we can create a logical representation of the database structure of each of companies' business operating systems. An entity is an object that can be identified in the user's work environment and that users want to track. Whilst relationship describes how one or more entities are related with each other. (Kroenke, 2000). In this study it is assumed that each PIP has a recursive relationship with one another and itself. Figure 1 below illustrates a model of an E-R diagram using a set of standardized conventions.

5.0 THE SUPPLY-CHAIN FLOW FACTOR



Note: C= company, V= vendors, P= parent company
Figure 1: The E-R Diagram of RosettaNet Enterprises

Figure 1 is a theoretical diagram that shows the conventional business operating procedures in procurement among RN enterprises in Penang. Each company utilizes a set of PIP protocols with both its parent companies and vendors. In this case the vendors are the suppliers of the raw materials and even logistics partners. The diamond shaped symbol describes the ratio of relations between the entities. In this illustration, there are four entities, namely the PIP's, the company, the vendor and the parent company. The relationship cardinality of (1:1) suggests that the flow of information between the entities is one to one basis. In the case for C2, the relationship cardinality was (1:N) that suggests that the PIP's used are mandatory and needs to use by all companies. All the vendors have to abide by the same E-R rule of (1:1) basis with the parent company. This implies that the PIP's used by the vendors are more standardized to ensure consistency of information flow which is crucial to avoid any delays in the delivery of raw materials. The parent company illustrates a cardinality of (N: M) which suggests that it has many-to-many relationship with all the entities.

6.0 CONCLUSION

In general, despite the slow uptake on the adoption of RN (PIP)s, each company in Penang showed strong interest in its development and potential use to facilitate e-procurement. By using the standardized protocols, efficiency and effectiveness can be achieved which will prepare the Bumiputera companies especially to compete and participated in the global supply-chain for electronics manufacturing. As Malaysia enters into the 21st century, the companies need to be aware of its role as global manufacturers and suppliers and ensure the quality of its products. The main challenge for the companies now is changing paradigms for both management and its employees. Hence the adoption of the standards would need to adopt at a faster pace and gain consensus of its usage across companies within the manufacturing sectors across Malaysia. All companies agree to standardization of protocols during data interchange. In conclusion the RN standard would prove to be successful only when all enterprises comply with its RN PIP directory and agree on common business data entities and operations.

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