Asia-Pacific
Economic Cooperation

APEC SME 2001 Conference

on

Strategic Alliances for Efficient Supply Chain Management

Strengthening the Role of APEC SMEs in Global Supply Chains

August 1–3, 2001
Imperial Queen's Park Hotel
Bangkok, Thailand

Organized By

DEPARTMENT OF INDUSTRIAL PROMOTION
MINISTRY OF INDUSTRY

In Cooperation With

THAI LOGISTICS AND PRODUCTION SOCIETY

RANGSIT UNIVERSITY

EAN THAILAND
FEDERATION OF THAI INDUSTRIES

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INVITATION

It gives us great pleasure to invite the official APEC delegates and participants from both business and academia to the APEC SME 2001 Conference on Strategic Alliances for Efficient Supply Chain Management (SCM), to be held in Bangkok on August 1 – 3, 2001.

Thailand is very honoured to have been given the mandate by the Seventh APEC Ministerial Meeting on Small and Medium Enterprises (SMEs) to work closely with the Policy Level Group on SMEs to elaborate on the subject and organize a conference on "Strategic Alliances for Better Global Supply Chain Management."

In the context of business globalization and trade liberalization, the importance of supply chain management as a regional and international economic issue cannot be overemphasized in each APEC economy. Likewise, in Thailand where SMEs have always been a pillar of our economic progress, we pose this challenge to our local SMEs to increase their awareness and adoption of appropriate SCM concepts and practices as a viable strategy to remain competitive.

We have put in a lot of efforts to ensure that this Conference will truly stimulate a dynamic exchange and sharing of experiences among the participants who will hopefully work towards formulating a set of recommendations and an action plan. Hence, it is with great expectations that we organize this Conference in order to achieve productive and synergistic results beneficial to all parties.

May we therefore reiterate our cordial invitation and warm welcome to all our delegates and guests, and we thank you in advance for responding to our invitation.

Mr. Manu Leopairote
Permanent Secretary
Ministry of Industry
Royal Thai Government

APEC SME 2001 Conference
on
Strategic Alliances for Efficient Supply Chain Management

Background:

At the Seventh Ministerial Meeting of APEC Small and Medium Enterprises (SMEs), held in Bandar Seri Begawan, Brunei Darussalam, in June 2000, four main issues were covered: Capacity Building of APEC SMEs, Enabling APEC SMEs to Capitalize on Electronic Commerce, Making Financial and Capital Markets More Accessible to SMEs, and *Towards Harnessing Diversity for Shared Economic Prosperity*. With respect to the last topic, the ministers recognized the need for SMEs to form vertical and horizontal alliances among themselves, with larger corporations, and with foreign companies. They emphasized the necessity to embrace modern technologies such as bar-coding, Electronic Data Interchange (EDI) and E-commerce to enhance SMEs' efficiency. In this context, the ministers requested Thailand to work closely with the APEC Policy Level Group on SMEs (PLGSME) to build on the idea of "Strategic Alliances for Better Global Supply Chain Management." Thus, this conference was initiated.

Small and medium enterprises comprise the vast majority of enterprises in the APEC economies, and at present face the same challenges as large firms in today's globally competitive landscape. These challenges arise out of customer demands to deliver quality products faster and at lesser cost as well as providing excellent after sales services to the ever-expanding marketplace worldwide. Currently, large numbers of multinational corporations have moved their manufacturing operations overseas where they rely on local SMEs to supply the necessary parts, raw materials and services. This has allowed them to reduce costs and to respond better to market requirements but they have also been hampered in this process by the less efficient SME suppliers. It is clear that large corporations and SMEs need each other.

Since the early 1990s, Supply Chain Management (SCM) has emerged as the preeminent method of increasing supply chain efficiency. One of the precepts of SCM is that it is groups of companies (supply chains) which compete, not individual companies. Research of experienced firms has shown that buyers and suppliers in strong supply chains tend to form strategic alliances. This is because effective SCM requires extensive cooperation between all members in a supply chain, especially in activities such as exchanging information to streamline operations.

Through the use of vertical and horizontal strategic alliances, SMEs have been able to gain influence in all their business relationships. Large companies use SCM concepts to derive more value from their suppliers' suppliers and to respond better to their customers' customers. While there are many successful alliances in existence, they are not yet widespread among APEC SMEs. However, if APEC SMEs can institute successful strategic alliances and implement SCM, it can create a "win-win-win" situation for the suppliers, buyers, and the end consumers. *The challenge is to increase awareness and adoption of appropriate SCM concept and good practices among APEC SMEs.*

It has been proposed that APEC economies should set up a network of SCM support centers (which could be real or virtual) that can coordinate activities to generate awareness and help SMEs adopt suitable SCM practices and achieve optimal SCM performance. These support centers can:

- help SMEs understand the unique aspects of SCM,
- impart knowledge of existing and emerging SCM technologies, and
- act as catalysts in creating successful vertical and horizontal alliances.

Objective:

To provide a forum in which delegates from APEC member economies :

- share experiences and best practices in nurturing strategic alliances in SCM,
- determine the tasks that SME support centers should perform,
- brainstorm concrete ideas on how to accomplish these tasks, and
- recommend policy directions and action plans to be implemented under APEC.

Target Audience:

APEC delegates, representatives of SME promotion agencies, industrial policy making bodies, industrial and trade associations, special interest groups such as professional societies, and SME entrepreneurs.

Expected Number of Participants:

200 – 250 self-financed local and overseas participants.

Registration Fee: US$100

Deadline for Registration: 30 June 2001

Language of Conference: ENGLISH

Venue:
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http://www.smesupplychain.net

Exhibition:

The Mini Educational Exhibition is intended to support the theme subjects of the Conference focusing on SCM.

The intended areas to be covered in the mini exhibition will include the following:

1. Electronic Data Interchange
2. Bar Codes for goods identification and logistics
3. E-Business Processes
4. Supply Chain Management
5. Global E-Standard for Trade Communication
6. Strategic International Assistance And Matchmaking Program (SIAM)

There will be posters, displays, brochures and video on the topics above to promote knowledge of global standards for trading and logistics.

CONFERENCE AND WORKSHOP PROGRAM

Day 1 (Wednesday, August 1, 2001)

Best Practices of Strategic Alliances for Efficient Supply Chain Management

08:00-09:00 Registration

09:00-09:30 ***Opening Ceremony and Keynote Address by Prime Minister of Thailand***
The Importance of Improving SME Value Chains
Why SMEs must improve the functions that add value to the goods and services they produce to become worthy members of a supply chain.

09:30-10:00 Refreshments

10:00-11:00 **Critical Success Factors in Supply Chain Management / Strategic Alliances**
Measures of Success. How can strategic alliances both vertically and horizontally benefit every member along the Supply Chain? What kind of Strategic Alliances are most relevant to APEC SMEs in a cross-border context? What are the expectations of Large Firms on SMEs? Minimum levels of technological competency. How to make SMEs attractive to Large Firms.
Speaker: *Carol A. Ptak, APICS 2000 President and CEO*
IBM Program Director, Midmarket solutions, IBM Corp, U.S.A.

11:00-12:30 **Examples of Successful Vertical and Horizontal Alliances in Supply Chain Management**
Critical appraisal of the specific environment, conditions, laws, and organizations that have contributed to the success of vertical and horizontal alliances. Special attention on cross-border SME alliances. *(30-35 minutes presentation with 10 minutes questions & comments)*

- 11:00-11:45 **Best Practices in the Automobile Industry**
  Speaker: *Satoshi Kuroiwa, Project General Manager,*
  IT & Telecom Business Division
  Toyota Motor Corporation, Japan

- 11:45-12:30 **Best Practices in the Electronics Industry**
  Speaker: *Richard Shieh, Business General Manager*
  Compaq Computer Taiwan Ltd., Chinese Taipei

12:30-13:30 Lunch

13:30-15:00 **Examples of Successful Vertical and Horizontal Alliances in Supply Chain Management**

- 13:30-14:15 **Best Practices in the Food Industry**
  Speaker: *Chatchai Boonyarat, Vice Chairman,*
  The Federation of Thai Industries
  and Chairman, Malee Group, Thailand

- 14:15-15:00 **Best Practices in the Textile & Garment Industry**
  Speakers: *Anna Lin, Chief Executive, Hong Kong Article Numbering Association (EAN- Hong Kong)*
  Barbara Tresselt, Manager Merchandise Operation & Process Development, Target Corporation, USA
  Michael Yee, Chief Information Officer, Esquel Group

15:00-15:30 Refreshments

15:30-16:00 **Enabling Technologies in SCM**
Relevant technologies in physical distribution and logistics. Information Technologies and standards such as Bar Coding, Electronic Data Interchange (EDI), Extensible Mark-up Language (XML) used in the creation of more efficient Supply Chain Management.
Speaker: Steven Pereira, General Manager - E-Commerce Development
EAN Australia, Australia

16:00-16:30 **Supply Chain Benchmarking**
Measuring supply chain success. Supply chain member performance measurements. What are the appropriate achievements to aim for in what time span? How to keep up with World-Class Standards?
Speaker: Krizz Chantjiraporn, Director
EAN Thailand Institute, Thailand

16:30-17:00 **Partnership Development**
More on Strategic Alliances. How do SMEs find the right partners, then build and maintain the relationships? How can partners defuse problems while keeping the relationship intact? Differences and issues in developing intraeconomy and intereconomy alliances.
Speaker: Dr. Jennifer Bremer, Director
The Kenan Institute in Washington, U.S.A.

17:00-17:30 **External Environment Barriers**
What are the laws, regulations, standards, or infrastructures that need to be put in place in order to create a suitable environment for SMEs to build competitive strategic alliances in the Global Supply Chain? What is the role of government towards this end? What are the barriers facing cross-border SMEs?
Speaker: Dr. Mark Goh, Associate Professor
Co-Director of Penn-State NUS Programme
Faculty Logistics Management Area Coordinator
National University of Singapore, Singapore

18:30-20:30 **Welcome Dinner**

Day 2 (Thursday, August 2, 2001)
Brainstorming Workshops

08:30-10:30 **Brief Presentation by Each APEC Economy**

10:30-10:45 Refreshments

10:45-12:00 **Brief Presentation by Each APEC Economy (continued)**

12:00-13:00 Lunch

13:00-13.30 **Concept of SMEs Support Center for Supply Chain Management**
Objectives, Possible modes of operation (physical,virtual,etc.), Key success factors, Possible partners
Speaker: Dr. Supriya Sithikong, Department of Industrial Promotion

13.30-15.30 **Group Workshops**

1. **Enabling Technologies in SCM**
2. **Supply Chain Benchmarking**
3. **Partnership Development**
4. **External Environment Barriers**

Each workshop group has the following tasks:

- Review of assistance requests and assistance offers with respect to the needs of each economy that can be achieved through the support centers.
- Convert group's collective thoughts on assistance requests and offers into activities that the support centers can facilitate.
- Scrutinize requests/offers and present expert observations on proposed activities.
- Prioritize support center activities.
- Conclude group's outputs.
- Adopt Group Report (for final-day presentation)

15.30-15.45 Refreshments

15.45-17.30 **Group Workshops (continued)**

Day 3 (Friday, August 3, 2001)
Presentation of Findings and Conclusions

08:30-09:30 **Groups' Final Preparation for Presentation**

09:30-10:30 **Presentations of Workshop Findings & Recommendations (Groups 1&2)**
Plenary session where representative of each of the 4 groups presents the group's findings and recommendations (with visual aids and hand-out materials). Discussion of the findings is open to conference attendees.

10:30-11:00 Refreshments

11:00-12:00 **Presentations of Workshop Findings & Recommendations (Groups 3&4)**

12:00-12:30 **Open Discussions**

12:30-13:30 Lunch

13:30-15:00 **Preparation for Recommendations and Action Plan**

15:00-16:00 **Adoption of Recommendations and Action Plan**
APEC delegates shall formally adopt recommendations for action plan of programs and activities to be implemented under APEC, based on workshop findings and plenary discussions. Immediate "Next Steps" will be clearly specified.

16:00-16:30 **Closing Ceremony**

16:30 Adjourn for Refreshments

ASIA-PACIFIC ECONOMIC COOPERATION

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on

Strategic Alliances for Efficient Supply Chain Management

Strengthening the Role of APEC SMEs in Global Supply Chains

Imperial Queen's Park Hotel,
Bangkok, Thailand
August 1-3, 2001

Keynote Address
by
His Excellency Thaksin Shinawatra
Prime Minister, Royal Thai Government

on

The Importance of Improving SME Value Chains

Excellencies,
Honorable APEC Delegates and Speakers,
Distinguished Guests,
Ladies and Gentlemen,

I would like to wish you all a very warm welcome to Thailand, and to this APEC Conference. We are very proud and honored that APEC has agreed to co-sponsor this important gathering with Thailand.

It is my privilege this morning to open this Conference and speak on "The Importance of Improving SMEs Value Chains." As such, I would like to combine these two activities into one to save time because I know you have a full day's schedule ahead of you.

This Conference has been named the "APEC SME 2001 Conference on Strategic Alliances for Efficient Supply Chain Management." It is a rather specific topic and is almost self-explanatory. However, it holds much more significance than it seems when you first read it. I believe it also poses a tremendous challenge to us all to really make this objective happen for the sake of the millions of small and medium enterprises (SMEs) throughout the 21 APEC economies. Their survival depends on everyone's understanding how every business, and every economy, should be connected in the future.

At present, the APEC economies continue to be the main driving force of the world's economy. We all know that our SMEs have played a very significant role in making this happen. It is therefore in our best interests to help them become lean, fast and efficient in order to compete successfully. However, with the rapid technological changes that are taking place around us, not all SMEs can move quickly enough to remain competitive. Therefore, governments need to step in and lend a helping hand since the SMEs require assistance in coping with the rapid pace of change.

I firmly believe the APEC economies should work closely together in this matter. We need to understand that the short- and long-term impact of the economic policies that we make will affect industries within the APEC economies and the SMEs in those industries. Of course, it is easier said than done. Therefore, we must work together to find ways to strengthen, diversify and improve the value added focus of SMEs so that they are able to withstand and respond to the new value requirements of a new discerning marketplace, and thus break away from the old supply chain as well as the ups and downs of the world's economic cycles. In particular, we need to understand that a decline in market demand or slowdown in world economic activities beyond their control can cause severe crippling effects or even the mass extinction of SMEs in certain sectors of each APEC economy, such as in the autoparts industry cluster. We must therefore find ways to enable SMEs to restructure and avoid this, or at least to mitigate the effects as much as possible. It is our responsibility to do so.

I am very pleased to learn that this Conference on supply chain management will attempt to help our SMEs to become more competitive by broadening their vision and their efficiency. Indeed, I believe it is the only way to enable them to survive. I applaud your efforts in this regard. As for Thailand, under my administration, we are putting much greater emphasis on identifying the role of these new types of SMEs in Information Technology (IT), marketing technology, improvement of product differentiation, and improvement of value yields. We also seek greater cooperation with various governments as well as the private sector. This should provide a broader framework that will make our efforts more effective. I welcome any suggestions that will improve SME yields, foster tighter integration, create stronger alliances, and help us achieve our common goal of improving and sharing prosperity within the APEC economies.

You may recall that at APEC's Seventh SME Ministerial Meeting, held in Brunei Darussalam in June 2000, Thailand urged all APEC economies to make concerted efforts to build strategic alliances for improved global supply chain management. The ministers at that meeting endorsed Thailand's proposal to host this Conference. It is hoped that today's discussions will focus on how best to form strategic alliances among SMEs as well as between SMEs and larger corporations. We should take advantage of the presence of so many knowledgeable resource persons at this meeting to proceed expeditiously on the path of identifying and forging these alliances for the sake of re-invigorating the global economy at this critical time. Yet at the same time, we must look to renew the impetus to improve SME management to new horizons and to avoid the present difficulties due to the cyclical slowdown.

Although I may be biased, I think it is quite fitting that APEC concurred on Thailand as the appropriate host economy for this important Conference. Let me tell you why. As you all are aware, in 1997, Thailand and a number of Asian economies suffered under the pressure of business and economic forces, both externally and internally. All of us were blinded by over-speculation of the bubble era back then, acting as if our impressive economic growth would never end. In a number of sectors of our economy, there were over-investments in businesses where genuine demand did not exist. And when the reality set in, nearly all these new business activities slowed drastically or came to a halt! Put simply, supply exceeded demand. It is hard to believe that things had happened so fast and caused such severe impact that we are still feeling the repercussions today after more than four years. Many big businesses in Thailand failed and, no doubt, many SMEs were caught in this death trap as well. This was a hard and painful lesson, but one that showed without question the interconnectedness of businesses around the world or, using the newer term, "the global supply domino chains."

More recently, this year we observed a similar downturn of the dot-com or Internet industries in developed economies. As soon as people recognized that real demand for electronic commerce had not yet grown to predicted levels, or financial performances were below expectation, investment in the electronics and telecommunications businesses dropped abruptly. This has sent a chill throughout the global e-business

supply chains, who grew but were completely dependent on growing with the cluster, but cannot stand alone. Without a doubt, some portions of the chains pass through other APEC economies. I am, however, surprised at the speed with which it has happened. We have been observing the adverse effects as they lash through certain sectors of our own economy. Perhaps this is a signal of what can be expected in the future as well. Even with all the available technology, we are not immune to shocks when demand is overestimated with no safeguards such as diversification to fall back on. It seems to me that producing for such a limited market will ensure that whenever some of the eminent APEC economies sneeze, others can catch cold!

I think we all understand how uncomfortable we are when we catch a cold, sometimes a severe cold. It is ironic that, to date, mankind has not been able to find a complete cure for the common cold. Perhaps, it is our destiny to go through cycles of catching colds. The same is true with economic cold cycles. Perhaps it is unavoidable that we have to go through cycles of ups and downs, and sometimes even get hit by an economic crisis, because we create our supply chains to be so dependent on each interdependent cluster. This approach and mindset, if maintained, will keep our economies in a permanent "cold" syndrome. Nevertheless, we have observed that people who are fairly healthy are more immune to catching colds.

Some analysts have observed that SMEs, by their very nature, are more vulnerable than large corporations due to their limited scope and resources. This is not true. The validity of this statement depends actually on which type of SME we are talking about.

One type of SMEs are those who form part of the supply chain, or supporting industries, for major corporations. Such companies inevitably run into a host of problems when there is a shift in global demand that adversely affect the corporations. These SMEs, in effect, have become a captive prisoner of the large corporations and slave to price reductions.

Another type of SMEs are those who network among themselves and sell finished products to one another. The demand for products manufactured by these SMEs is more flexible than the first group and, as a result, they are less vulnerable to shifts in global demand. If these SMEs can differentiate and improve their product to serve higher value chains, their success rate will improve exponentially.

The third group of SMEs are the so-called "stand alone" SMEs who sell their products directly to the customers on a global basis. Such companies need to develop a thorough understanding of the changing needs and tastes of customers in the present day and age. The success of their business depends on the competitive pricing of their goods and the highly efficient use of modern telecommunications, the Internet and advanced delivery systems. This group are the new entrepreneurs, who will enjoy higher yields in income and greater security in the long term.

While Thailand has all three groups of SMEs who need to be supported, it is this third group that we will have to pay special attention to help nurture and develop. The

new phenomenon we are seeing in the world is that a new and dynamic demand has arisen for innovative products that suit modern-day global lifestyles and new market requirements. To deal with this phenomenon, we will need to draw upon our traditional capabilities, aesthetic skills, and unique local know-how. And SMEs can provide the best and most flexible means for satisfying this new demand.

I believe no one will argue with the statement that consumers today have much greater choice, information, and access than ever before. And we all must compete to deliver value to them. Let me just briefly say, however, that there still lies a fundamental problem in the idea of what exactly is "valued." Every participant may have his own opinion on this matter. The easiest way to get closer to the truth, however, is to begin making contact with other businesses and other people. One way in particular is through forming strategic alliances. SMEs often do not have the research capabilities or contacts to understand where they can create the most value. As an extreme example, one SME owner may ask his relatives whether they would buy his product. This obviously does not qualify as exhaustive market research. It is by sharing and gathering information from customers, other companies, and cooperating in decision making that every company can begin to get a better picture of what "value" is. They will have to learn R&D, marketing research and greater innovation to ensure that their returns continue to be at the cutting edge of the new marketplace.

The same simple facts of life remain. Those companies that fail to perform will not survive. Suppliers who do not deliver the right goods to the right place at the right time for the right price will eventually lose their business links. SMEs that remain disconnected from and resistant to change will eventually see their income flows deteriorate. The world is changing fast and consumer and business expectations are changing at an even faster pace. SMEs that can adapt quickly to change, and utilize technology to improve business, stand a better chance to succeed and survive. SMEs that know how to fulfil their customers' expectations by creating value for their products and services will prosper. The economy of speed is paramount.

I think it is fair to assume that everyone attending this Conference is already convinced of the need to change, so let us move on to the next question of "how." A simple truth in business is that there are many activities that comprise what we call value chains. A typical entrepreneur knows that the products or services he creates can generate margins and profit for his business. The chain of value-added activities begins with getting customers' orders through the various marketing and sales activities, buying raw materials, making the products, shipping them to the customers, and providing after-sales service. It is important that these value-added activities be properly managed so that only the absolutely necessary costs are added. I believe that the key to success is proper coordination among all activities—internal and external. Every activity needs to be scrutinized to determine whether or not it has added any value or whether it is merely adding cost, even the simple act of shipping a product from point A to point B.
It is important for SMEs to eliminate all unnecessary steps and costs in their business procedures. They need to listen to their customers and their suppliers and, together with their trading partners, find innovative approaches to reducing

costs, while creating strategically unique value. They need to do this together. Moreover, I would like to add the closer the SMEs are with the consumers, the greater the margin they will have.

In short, "the whole is greater than the sum of its parts", especially for SMEs involved in supporting industries. To be successful and profitable requires effective cost management, proper technology, guaranteed quality control and reliability. It must be a total concept, not piecemeal. Supporting industries and cluster SMEs need to work closely together to complement and support one another. This is an old observation, made long before the term "supply-chain" was coined. In the past, it has been easier for big international corporations to understand this idea, since they dealt with these issues all the time. But that time is over. Now every SME, if it plays a role in a larger chain, needs to understand and act on this idea if it wishes to survive.

Today, we can improve our value chains by learning from each other. There are many best practices within our APEC economies that we can benefit from. We should encourage people from all economies to share information. I spoke earlier about the challenge we face in changing our SMEs. **Whether or not our SMEs engage in cross-border trade, I think our first challenge is for them to learn this new and powerful concept of producing high value improved products in the new global market place. Doing so will automatically strengthen their value in any supply chain or in a stand alone mode, and make them more competitive. Our governments should also facilitate such activities as much as possible.**

I am pleased that this Conference is to decide on the usefulness and form of "SME support centers" for each of our APEC economies, and I look forward to your agreed response to this important issue.

In closing, I wish you every success in this Conference. I am confident that this gathering will be a major step forward in achieving the goal of strategic alliances to help strengthen SMEs in their efforts to reap the benefits of supply chain management. I wish you a pleasant stay here in Thailand and hereby officially declare this Conference open.

FINAL CONFERENCE/WORKSHOP REPORT

APEC SME 2001 Conference on Strategic Alliances for Efficient Supply Chain Management : Strengthening the Role of APEC SMEs in Global Supply Chains
August 1-3, 2001
Bangkok, Thailand

The APEC SME 2001 Conference on Strategic Alliances for Efficient Supply Chain Management, was held at the Imperial Queen's Park Hotel in Bangkok, Thailand during August 1-3, 2001. **The purpose of this conference was to determine the viability of setting up a network of SCM Support Centers for SMEs within the APEC economies.** The opening ceremony was presided over by His Excellency Pol. Lt. Col. Thaksin Shinawatra, Prime Minister of Thailand. Delegates from 17 APEC economies together with interested participants deliberated on the roles of these support centers, with regard to four areas affecting "efficient supply chain management." These were conducted using four workshops: Enabling Technologies, Benchmarking, Partnership Development, and External Environmental Barriers. The delegates have proposed a set of recommendations concerning the activities of these support centers, to be submitted to the next APEC SME Ministerial Meeting in Shanghai, People's Republic of China. These recommendations are contained in the Final Conference/Workshop Report adopted by all delegates. The adoption session was chaired by Mr. Pramode Vidtayasuk, Deputy Director General, Department of Industrial Promotion, Ministry of Industry. The closing ceremony was presided over by Mr. Satit Sirirangkamanont, Inspector General, Ministry of Industry. The final schedule, Introductory speech of Minister of Industry and Keynote Address of the Prime Minister of Thailand, and list of the speakers, delegates, and participants appeared in the appendices.

1. The Importance of a Supply Chain Management (SCM) Support Center for SMEs

The idea behind the support centers for SMEs originated from the simple idea that SMEs in a large number of APEC economies need support in undertaking and implementing Supply Chain Management techniques. Because of the shared concern about APEC SMEs on SCM, each APEC economy should consider designating and/or creating one "**APEC-SCM Support Center**" to serve as a focal point where APEC economies can disseminate APEC Supply Chain Management programs to their SMEs. These APEC-SCM support centers can then report the progress of these programs back to APEC.

2. Characteristics of Individual Economy SCM Support Centers

Since each individual economy varies in terms of the maturity and diversity of agencies supporting SMEs and SCM activities, there appears to be a consensus for each individual economy to develop its own network of SCM support centers

for SMEs. The nature and form of this support center can vary depending on how an individual economy sees fit. For example, one economy might want to develop SCM support centers by industry; another might want to do this according to market segments; others might want to do this according to technological infrastructure. Some economies might seek government intervention as an appropriate way to form the SCM support center; others might want to have the support center(s) formed naturally.

With respect to the differences in the stage of economic development, APEC can play the role of facilitating the sharing of knowledge from developed economies to developing economies. This knowledge might include training materials, technical assistance, and assessment tools. A standard, global location numbering for all SMEs and their alliance partners could also be initiated by APEC.

3. Roles and Functions of the SCM support center for SMEs

3.1 Enabling Technologies in SCM

To assist the SMEs in adopting enabling technologies, the SCM support centers for SMEs should play the following roles:

a) Advise and disseminate knowledge and information in conjunction with leading organizations

- Identify availability of solutions and service providers
- Promote the use of enabling technologies, which includes
  - Electronic data exchange
  - Bar coding
  - Standards for product identification and description
  - System for tracking and tracing products
  - Electronic catalog for synchronization of data
  - E-learning
- Provide training on the use of enabling technologies. To be effective, training must serve the needs of users, managers and implementers
- Develop role models for experience sharing
- Evaluate the effectiveness of unproven initiatives

b) Benchmark on adoption of enabling technologies

c) Provide discussion forums for the SMEs to inquire and answer each other's problems regarding technology

d) Work towards better funding for SMEs by lobbying government for financial support, providing advice about existing programs, and assisting in the development of business cases

It should be emphasized that different economies with their disparate business sectors could require different kinds of support to adopt and maximize the enabling technologies.

3.2 Supply Chain Benchmarking

The idea of establishing support center is supported in the benchmarking workshop. The key issue that has been focused under the area of benchmarking in supply chain management is the development of key performance indicators (KPI) for industries and businesses. The major concern under this KPI issue is on the selective KPI particularly for SMEs. This KPI should also be driven from customers' perspectives which might be called Customer Expectation Performance Indicators (CEPI). Apart from this pressure from customer, it is expected that this KPI for supply chain should also be classified with respect to industrial sectors, by considering environmental factors and levels of resources/capability availability in SMEs.

In order to respond to these requirements, the participants request that the support centers for SMEs should play the following roles:

a) provide training on benchmarking
b) gather information from each economy for comparison
c) enable industries and businesses to learn from best practice
d) assist SMEs to reflect their own performance.

Finally, the workshop also recommends the formation of a working committee for benchmarking. The tasks of this working committee should include collecting process best practices through coordination with academia and industrialists in 9 months time after the endorsement, and secondly, providing an experience sharing/training session for APEC SMEs 6 months afterwards.

3.3 Partnership Development

To develop alliances and partnerships, the SCM support centers for SMEs should play the following roles:

a) Educate SMEs to be aware of the importance of SCM, the benefits of SMEs in entering the SCM alliance, the value of partnerships, the barriers and expectations

b) Promote and encourage relationship between partners

c) Build ethical business practices and good governance among partners

d) Help designing the general ground rules of partnership development

e) Help facilitating the mechanisms to explore and match potential partners in the supply chains of different industries, same industries, same market segment, cross-businesses, and/or cross-borders

f) Help alliance partners to use the same standards in their business transactions (e.g., using the same numbering systems in referring to their products and services)

g) Support general business functions (i.e., financial assistance, flexible credit facilities, marketing assistance, e-Business platform by government)

h) Create the databases of SMEs and their supply chain partners, both up-stream and down-stream and provide information to all parties involved

i) Serve as an information center to provide members with financial information, marketing information, and latest technology trends

j) Serve as a linkage between SMEs and large enterprises so that individual SMEs can be developed toward global standards

k) Help designing effective conflict resolution mechanisms

l) Offer training programs in the areas of best practices, win-win strategies, business process alignment, and global standard alignment

The government in each economy can play a proactive role by giving strong and continuous support to the formation and implementation of the SCM support centers and encourage their local SMEs to fully utilize the services of this center. Also, APEC should provide support to a networking of SCM Support Center of each individual economy to coordinate and cooperate so that a true Global SCM alliance among APEC economies can be realized.

3.4 External Environmental Barriers

To overcome external environmental barriers, SCM support centers for SMEs should play the following roles:

a) Assist member economies in setting up one-stop processing centers;

b) Facilitate matchmaking activities between SMEs;

c) Communicate issues raised to APEC member governments;

d) Compile directories of current globally-recognized technologies, standards, business solution providers, and other relevant information for SMEs;

e) Undertake promotional activities targeting SMEs about SCM by leveraging existing resources from trade associations and agencies in the economies;

f) Provide and update SCM training courses useful to SMEs;

g) Work to rationalize regulations and standards to unify customs procedures;

h) Encourage harmonized practices within specific industries;

i) Provide reference to best practice models;

j) Make SMEs aware of and give them information about global standards;

k) Advocate the shortening of import/export approval processes;

l) Assist industries in adopting codes of good practices;

m) Harmonize and create universally-recognized accreditation of training standards;

n) Establish centers for information exchange to leverage the existing global information infrastructures.

Measures to support the development of SCM practices cannot be achieved without the leadership and support of government. Such assistance should spring from support centers located in each individual economy. These support centers should be encouraged to collaborate efforts between economies and exchange information to promote mutually beneficial SCM practices in the APEC region.

4 Recommendations and Action Plan

The final recommendations and action plans are the following:

a) Each economy should identify a focal point of contact, and inform participating economies within three months after the 8th APEC SME Ministerial Meeting, August 29-30, 2001 in Shanghai, People's Republic of China.

b) Each economy should promote and support SCM initiatives and activities for SMEs through appropriate actions or measures (immediate).

c) APEC should establish a coordinating center to follow up and support the progress of individual economy by the 9th APEC SME Ministerial Meeting to be held in Mexico in 2002.

d) APEC SME Ministers should communicate its recommendations regarding SCM Support Center initiatives to other APEC working groups.

APPENDIX 1
CONFERENCE AND WORKSHOP PROGRAM

Day 1 (Wednesday, August 1, 2001)
Best Practices of Strategic Alliances for Efficient Supply Chain Management

09:00-09:30 ***Opening Ceremony and Keynote Address by Prime Minister of Thailand***
The Importance of Improving SME Value Chains
Why SMEs must improve the functions that add value to the goods and services they produce to become worthy members of a supply chain.

10:00-11:00 **Critical Success Factors in Supply Chain Management / Strategic Alliances**
Measures of Success. How can strategic alliances both vertically and horizontally benefit every member along the Supply Chain? What kind of Strategic Alliances are most relevant to APEC SMEs in a cross-border context? What are the expectations of Large Firms on SMEs? Minimum levels of technological competency. How to make SMEs attractive to Large Firms.
Speaker: *Ms. Carol A. Ptak, APICS 2000 President and CEO*
IBM Program Director, Midmarket solutions, IBM Corp, U.S.A.

11:00-12:30 **Examples of Successful Vertical and Horizontal Alliances in Supply Chain Management**
Critical appraisal of the specific environment, conditions, laws, and organizations that have contributed to the success of vertical and horizontal alliances. Special attention on cross-border SME alliances. *(30-35 minutes presentation with 10 minutes questions & comments)*

- 11:00-11:45 **Best Practices in the Automobile Industry**
  Speaker: *Mr. Satoshi Kuroiwa, Project General Manager, IT & Telecom Business Division Toyota Motor Corporation, Japan*

- 11:45-12:30 **Best Practices in the Electronics Industry**
  Speaker: *Mr. Richard Shieh, Business General Manager Compaq Computer Taiwan Ltd., Chinese Taipei*

13:30-15:00 **Examples of Successful Vertical and Horizontal Alliances in Supply Chain Management**

- 13:30-14:15 **Best Practices in the Food Industry**
  Speaker: *Mr. Chatchai Boonyarat, Vice Chairman, The Federation of Thai Industries and Chairman, Malee Group, Thailand*

- 14:15-15:00 **Best Practices in the Textile & Garment Industry**
  Speakers: *Ms. Anna Lin, Chief Executive, Hong Kong Article Numbering Association (EAN- Hong Kong)*
  Ms. Barbara Tresselt, Manager Merchandise Operation & Process Development, Target Corporation, USA
  Mr. Michael A. Yee, Chief Information Officer, Esquel Group

15:30-16:00 **Enabling Technologies in SCM**

Relevant technologies in physical distribution and logistics. Information Technologies and standards such as Bar Coding, Electronic Data Interchange (EDI), Extensible Mark-up Language (XML) used in the creation of more efficient Supply Chain Management.

Speaker: Mr. Steven Pereira, General Manager - E-Commerce Development
EAN Australia, Australia

16:00-16:30 **Supply Chain Benchmarking**

Measuring supply chain success. Supply chain member performance measurements. What are the appropriate achievements to aim for in what time span? How to keep up with World-Class Standards?

Speaker: Mr.Krizz Chantjiraporn, Director
EAN Thailand Institute, Thailand

16:30-17:00 **Partnership Development**

More on Strategic Alliances. How do SMEs find the right partners, then build and maintain the relationships? How can partners defuse problems while keeping the relationship intact? Differences and issues in developing intraeconomy and intereconomy alliances.

Speaker: Dr. Jennifer A. Bremer, Director
The Kenan Institute in Washington, U.S.A.

17:00-17:30 **External Environment Barriers**

What are the laws, regulations, standards, or infrastructures that need to be put in place in order to create a suitable environment for SMEs to build competitive strategic alliances in the Global Supply Chain? What is the role of government towards this end? What are the barriers facing cross-border SMEs?

Speaker: Dr. Mark Goh, Associate Professor
Co-Director of Penn-State NUS Programme
Faculty Logistics Management Area Coordinator
National University of Singapore, Singapore

Day 2 (Thursday, August 2, 2001)
Brainstorming Workshops

08:30-12:00 **Brief Presentation by the following APEC Economies**

- **Australia**
- **Brunei Darussalam**
- **Canada**
- **Hong Kong, China**
- **Indonesia**
- **Japan**
- **Korea**
- **Malaysia**
- **Peru**
- **Russia**
- **Singapore**
- **Chinese Taipei**
- **Thailand**
- **United States of America**
- **Vietnam**

13:00-13.30 **Concept of SMEs Support Center for Supply Chain Management**
Objectives, Possible modes of operation (physical,virtual,etc.), Key success factors, Possible partners
Speaker: Dr. Supriya Sithikong, Department of Industrial Promotion

13.30-15.30 **Group Workshops**

1. **Enabling Technologies in SCM**
   Chaired by Dr.Chatri Sripaipan, Policy Research and Innovation Division, National Science and Technology Development Agency (NSTDA)

2. **Supply Chain Benchmarking**
   Chaired by Mr.Prasit Tansuwan, Ex-Director, Thailand Productivity Institute.

3. **Partnership Development**
   Chaired by Mr.Satit Sirirangkamanont, Inspector General, Ministry of Industry.

4. **External Environment Barriers**
   Chaired by Ms. Puangrat Asavapisit, Deputy Director General, Department of Commercial Economy, Ministry of Commerce.

Each workshop group has the following tasks:

- Review of assistance requests and assistance offers with respect to the needs of each economy that can be achieved through the support centers.
- Convert group's collective thoughts on assistance requests and offers into activities that the support centers can facilitate.
- Scrutinize requests/offers and present expert observations on proposed activities.
- Prioritize support center activities.
- Conclude group's outputs.
- Adopt Group Report (for final-day presentation)

Day 3 (Friday, August 3, 2001)
Presentation of Findings and Conclusions

09:30-10:30 **Presentations of Workshop Findings & Recommendations (4 Groups)**
Plenary session where representative of each of the 4 groups presents the group's findings and recommendations (with visual aids and hand-out materials). Discussion of the findings is open to conference attendees.
Session chaired by Anna Lin, delegate from Hong Kong, China.

15:00-16:00 **Adoption of Recommendations and Action Plan**
APEC delegates formally adopt recommendations for action plan of programs and activities to be implemented under APEC, based on workshop findings and plenary discussions. Immediate "Next Steps" will be clearly specified.
Session chaired by Mr. Pramode Vidtayasuk, Deputy Director-General, Department of Industrial Promotion, Ministry of Industry --Conducted by Dr. Pricha Pantumsinchai, Dean of Graduate School of Rangsit University and President of Thai Logistics And Production Society, and Mr. Krizz Chantjiraporn, Director EAN Institute, Federation of Thai Industries.

16:00-16:30 **Closing Ceremony**
Closing Speech by Mr.Satit Sirirangkamanont, Inspector General, Ministry of Industry.

Workshop Findings Presentations

Enabling Technologies
Benchmarking
Partnership Development
External Environmental Barriers

Principles

- There is a lot of existing knowledge and technologies among APEC economies that should be shared
- SMEs should build up basic computer literacy and then move on to advanced SCM technologies
- Different economies and different sectors need different kinds of support

Technologies

- Electronic data exchange
- Bar coding
- Standards for product identification and description
- System for tracking and tracing products
- Electronic catalog for synchronization of data
- E-learning

Needs & Requirements

- Training
  - (1) managers (boss)
  - (2) users (not boss)
  - (3) implementers
- Infrastructure
  - e.g. telecommunication systems, network connectivity at reasonable price, reliable electricity source
- Solutions utilizing standards
- Capital

Roles of Support Centers

- Advise, disseminate knowledge and information
  - Identify availability of solutions and service providers
  - Promote the use of enabling technologies
  - Training on the use of enabling technologies
  - Development of role models for experience sharing
  - Prove the concepts
- Benchmarking on adoption
- Discussion forums
- Work towards better funding
  - lobby government
  - advise about existing programmes
  - assist the development of business cases

Structure of Support Centers

- Build on existing centers or programmes in each APEC economy
- Create an efficient and effective network connecting each of the centers
- Ensure resource availability and commitment
- Primarily virtual with coordinating office

Contributions

- Funding
- Incentives for SMEs to embrace technologies
- SCM experts with good knowledge of SMEs
- Sharing and developing training materials
- Sourcing of hardware, software, and networking technologies
- Hosting of the Center(s)
  - –government agencies, business associations, educational institutes, international organizations

Suggested Action Plan

- **A feasibility study to develop a detailed structure that links**
  - **local business associations**
  - **global supply chain organizations**
  - **educational institutions**
  - **APEC economies**
- **Approval and launch of the Center**

Report from the Group Workshop

on

Supply Chain Benchmarking

2 August 2000

Objective of our session:

Come up with a recommendation to support supply chain management using Benchmarking techniques

Contents

1. Brainstorming

Come up with 5 topics

- **A) Benchmarking learning process**
- **B) Capabilities towards benchmarking**
- **C) Developing key performance index (KPI)**
- **D) Features of support centre**
- **E) Benchmarking with respect to Environment**

2. Selected areas

The top two : (D & C)

D) Features of support centre

- **Definition of SME may be different**
- **Need to have a committee to study the details**
- **Set future directions and action plans**
- **Consider consortium benchmarking**
- **Awards those who with high KPI score (certificate ?)**

2. Selected areas (continued)

C) Developing key performance index (KPI)

- **Identify a common sets of KPI, extend to MNC**
- **Select KPI for SMEs**
- **KPI should be linked to the objectives of each functional activity**
- **The concept of customer satisfaction is important**
- **modified KPI to CEPI (Customer expectation performance index)**

3. Highlights of further discussion

- **Identify KPI in different industrial sectors by considering the**
  - **environmental factors**
  - **levels of resources / capability availability**
- **Result of this recommendations should benefit APEC SMEs**
  - **learn form information gathered from each economy**
  - **in some form of training...**
- **Learn from the best practice**
  - **identify and learn from the appropriate parties**

3. Highlights of the discussion

- **From best practices to boost KPI score**
- **Identify processes of the KPIs in a supply chain**
- **Good to have industry and academic collaboration among APEC economies**
- **Follow up the outcomes and share experiences within APEC economies (in 6 months?)**

Redefining the KPI

KPI (Measurement)

↓

CEPI (Set priorities) **(Customer expectation performance index)**

↓

Best practices (At process level)

4. Recommendations

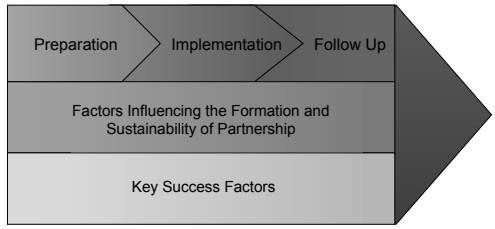
1. **Recommend to form a working committee on benchmarking under APEC sponsorship**
2. **Tasks for working committee:-**
   - **Define and collect process best practices from APEC economies, by coordinating academia and industrialists, (expected time : completed in 9 months time after endorsement)**
   - **Provide an experience sharing/training session for APEC SMEs (expected time: 6 months)**

Workshop: PARTNERSHIP DEVELOPMENT

APEC SME 2001 CONFERENCE on Strategic Alliances for Efficient Supply Chain Management

Aug 1-3, 2001
Bangkok, Thailand

Partnership Development



1. Preparation

1.1 Education

- To change mindset from trade secret to trade partner
- To know the whole supply chain concept
- To see the benefit of partnership development by showing successful cases

1.2 Building common goals

MNCs that adopt SCM, pass the knowledge to SMEs and encourage SMEs to change their vision and operation.

1. Preparation (cont'd)

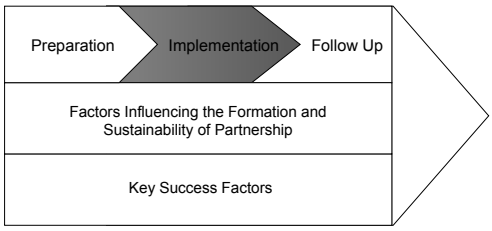
1.3 Identify the barriers

- Lack of information about partners/ competitor.
- Lack of capabilities/ expertise/ technology/ money.
- Different business system/ corporate culture
- No trust in business.

1.4 To provide business development tools

1.5 Joint/ sharing experience/ researches to reduce cost.

Partnership Development



2. Implementation

2.1 Characteristic economy model

- Individual economy model (economy-wide or industry specific)
- Multi economy model
- APEC support to form a network of different expert centers and share experience/expertise/knowledge flow

2.2 Role of support center

- Evaluation each alternative of support center
- To provide information/financial resources
- To be a match maker

2. Implementation (cont'd)

2.3 Role of Government

- To promote awareness of importance of SCM to SMEs
- To be facilitators
- To be strong and aggressive continuous supporters

2.4 Organization Handling Partnership Development

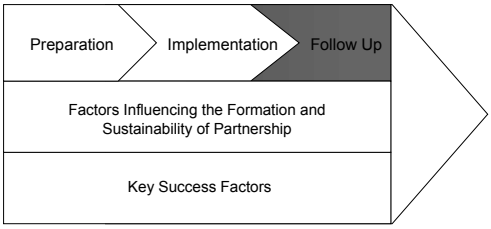
- Most government institutions
- Private consulting companies

2. Implementation (cont'd)

2.5 Structure of Support Centers

- Individual economy's model (economy-wide or industry specific) and share expertise and experience among APEC economies

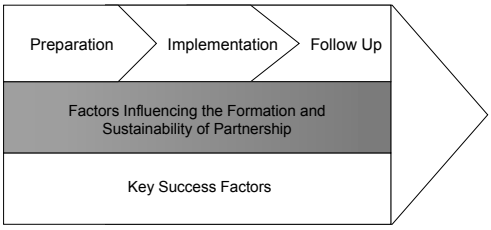
Partnership Development



3. Follow Up

3.1 Timely feedback about agreements and the implication of those agreements
3.2 Information from alliance partners are accurate and available as soon as needed
3.3 Help to mitigate possible conflicts

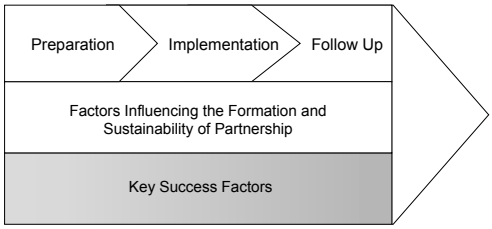
Partnership Development



4. Factors influencing the formation and sustainability of partnership

4.1 Business associations help their members adopt SCM
4.2 Standard of performance implementation and monitoring mechanism
4.3 Transparency for all parties
4.4 Long term goals and visions agree by all parties
4.5 Mutual trust and mutual benefit

Partnership Development



5. Key Success Factors

- Communication
- Change agent
- Win-Win business sense
- Promote benchmarking
- Encourage country directed SCM support
- Encourage large corporation involvement
- Enforce long-term and trusting relationship

APEC SME 2001 Conference on Strategic Alliances for Efficient Supply Chain Management

External Environmental Barriers

Issues /Barriers

- Regulations and Standards
  - non-tariff barriers
  - lack of coordination among agencies
  - certification requirements
  - lack of intellectual property protection
  - too many rule-making agencies

Issues /Barriers

- Infrastructure
  - lack of harmonized standards / specifications
- Power Relations / Negotiating Power Differences
- Technology and Knowledge
  - lack of access to information (no inquiry point)
  - lack of knowledge / expertise

Recommended Measures

Regulations and Standards

- Unify customs procedures
- Shorten the import approval process (e.g. Healthcare industry)
- Establish one-stop processing centers for all regulatory compliance measures
- Provide catalog of standard references
- Establish accreditation of training standards

Recommended Measures

Infrastructure

- Set up centers for information exchange (e.g. e-hub) to leverage existing global information infrastructures

Power Relations / Negotiating Power Differences

- Code of good practices

Recommended Measures

Technology and Knowledge

- Provide access to reference models / best practices
- Promote, among SMEs, awareness of and provide access to, information regarding global standard compliance

Strategies

1. Each economy should have a government agency designated to set up a support center.

2. Resources from Trade Associations / agencies should be leveraged to implement all planned activities.

3. Each economy develop an action plan to communicate 1 and 2

Roles and Action Plans

1. Assist member economies in setting up one-stop processing center. (within 12 months)

2. Facilitate matchmaking between SMEs. (within 12 months)

3. Channel issues of concern to Government. (within 6 months)

Roles and Action Plans

4. Compile a directory of current globally-recognized technology standards and business solution providers for SMEs. (ongoing)

5. Organize promotional activities targeting SMEs with respect to SCM. (ongoing)

6. Provide and update SCM training courses useful to SMEs. (ongoing)

Structures

1. Establish an Expert Group on SCM/SA/SME

2. Establish Excellence Centers for each SCM element

3. Establish a physical SCM/SA/SME Coordination Center with APEC support

Papers of Invited Speakers

Critical Success Factors in SCM and SA	Carol A. Ptak
Best Practices in the Automobile Industry	Satoshi Kuroiwa
Best Practices in the Electronics Industry	Richard Shieh
Best Practices in the Food Industry	Chatchai Boonyarat
Best Practices in the Textile & Garment Industry	Anna Lin Barbara Tresselt Michael Yee
SA in Supply Chain Benchmarking for SMEs	Krizz Chantjiraporn
Partnership Development	Dr. Jennifer Bremer
External Environmental Barriers for SCM	Prof. Mark Goh

Critical Success Factors in Supply Chain Management and Strategic Alliances

Carol A. Ptak, CFPIM, CIRM, Jonah
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cptak@us.ibm.com

Abstract
As firms of all size strive to achieve competitive advantage, they must consider integrating strategies relating to people, processes, and technology to drive value to the bottom line. The critical issue is that many managers do not see the company as a whole. Managers focus on their specific functions and departments and expect that the software or hardware to perform the needed enterprise integration. This integration has been extended across the supply chain and area expected to benefit both vertical and horizontal partners in the supply chain. This presentation will explore the holistic management approach necessary to drive competitive advantage for the enterprise and the necessary strategic alliances that are relevant to the small and medium sized enterprise in a cross-border context.

Technology can only provide bottom line results if it removes a current limitation for the business or adds capability that the business does not currently possess. If technology can remove limitations for the business, having the leaps forward in technology that we have experienced in just the past 20 years, it would seem that we should have also had the same leaps forward in bottom line returns. But we have not. Why? Because technology is necessary but not sufficient. This presentation will explore the business rules that must be changed to realize that potential and how success can be measured.

Keywords
Supply chain management, Performance measures, Strategic Alliance, Technological competency

Introduction

In the wonderful story of Alice in Wonderland, as Alice faced a critical fork in the road she asked the Cheshire Cat for directions. The famous response is as applicable to businesses today as it was to Alice. The road you take depends on where you want to go. If you do not know where you want to go then the road does not matter. It is also essential to be able to measures your progress towards that goal. As firms strive to achieve competitive advantage, there must be a clear articulation of the goal. Although that seems so simple, it can be as complex as the company itself.

In the early 1980's Dr. Eli Goldratt wrote the now famous work, The Goal. In it, he asserts that the goal of most companies is to make a profit now and into the future. Later, Dr. Goldratt, in Necessary but not Sufficient with Ptak and Schragenheim, asserts that technology is necessary

but not sufficient to achieving that goal. To truly achieve competitive advantage a company must exploit their constraints and integrate their strategies relating to people, processes, and technology to drive real value to the bottom line. It is not about the fastest and latest technology – it is about real business.

C.O.M.P.E.T.E.

Advertising on television, radio and newspapers declare that the world has entered a new age of supply chain management – the age of "e". We see e-business, e-commerce, e-mail, e-tickets, and e-just about everything else. Many businesses worry that they are falling behind in this e-age and they may never catch up. As soon as a new system is purchased, that technology is replaced by newer technology. While waiting for technology to stabilize a company can fall further and further behind. At the same time resources are getting scarcer and companies can't afford to make a mistake. So what can a small company do? **C.O.M.P.E.T.E.**!

Computers: Clearly computers are here to stay and the rate of change only promises to get faster. The futurists tell us that this change will be as significant as the Industrial Age was. Computers are simply the catalyst for this change. Technology has become integral to how we accomplish even the simplest business task. Just think how a letter was written just 10 short years ago and compare that to the speed of communication today. With that change in speed there is also changing customer expectations. Customers now expect that your company should be available for business 24 hours a day, 7 days a week, 365 days a year. Choosing reliable, scaleable and secure systems is not optional to survive in this new e-world.

A common mistake is to take each purchase in isolation and attempt to piece them together later on. A smart company begins with the desired end in mind and adds building blocks as needed rather than throwing away the entire legacy system all at one time. This approach minimizes the risk of each project as additional functionality is added.

Many companies are very price sensitive. However, purchasing hardware and software by price alone is a very dangerous strategy. Is it really a bargain if the hardware and software combination can deliver information to the customer only 90% of the time? Minimum expectations should be 100% up time for the system – including planned and unplanned downtime. Who is responsible to make sure the combination of hardware and software works? That little extra expense to purchase hardware, software, and integration services from the same supplier can be cheap insurance. Given the rate of technological change, problems with technology are not a matter of "if" but rather a matter of "when". Selecting a reputable firm that will ensure that your systems will continue to run is an important strategic decision not to be delegated to the IT staff.

Operations: Technology is necessary but not sufficient to achieve success. Increased use of technology in a business exposes the internal infrastructure directly to the customer. Ineffective operations performance can no longer be masked by the company personnel positioned between the customer and the internal processes. Customers are allowed to interact with the core business systems directly. For most companies, internal company personnel are a core competency and competitive advantage. These people are willing to go above and beyond

routine duties to ensure the customer's satisfaction. When these processes are automated through a new system selection and implementation, significant business issues can result. When selecting a new system, remember not to just automate what is currently being done. The new system should provide a way to improve current operations performance.

Money: Can a company afford to purchase a new technology? On the other hand, can a company afford not to purchase the new technology? However, the purchase of a new system is a significant investment for any company and there are insufficient assets to make a mistake. Ensure that the system selected will drive a positive bottom line result. It is very easy to become trapped in the enthusiasm of technology and purchase more than what is really needed only to find out the return is not there.

A common trend is to lease the equipment rather than purchase. The desire to own is strong in many companies but given the rate of technology change it can be cheaper in the long run to lease equipment on a fixed trade-in schedule. Including financing or leasing in the deal provides another negotiating lever when purchasing a new system. Typically there is a great deal of room for negotiation in terms and this can provide a cost effective way for even the smallest company to obtain the powerful systems it needs.

Partner: Unless selecting and installing technology is a core competency for the business, pick a partner that can provide a wide variety of services and ensure that it works. Purchasing the software from one vendor, the hardware from another, middleware from yet another and have someone from an entirely different company responsible for putting it all together can be the recipe for failure. "One guy by the tie" can be a key success strategy. Having one company responsible for making sure the combination that you just bought works – all the time. This partner should understand your business issues and overall company goals. Their job is to not only keep the system you already purchased up and running but also be on the lookout for new and better (and less expensive) ways of doing things.

Enabled: How will this new system enable the business to do things that it could not do before? ERP systems can drive tremendous return on investment for larger companies through the integration of business function. However, small companies do not have that same kind of complexity so they will not achieve the same level of return by installing these back end infrastructure systems. Smaller companies can derive tremendous return on investment when the technology enables them to do things that could not be done before or economically entering markets that were not possible before. Having the company's products offered on e-marketplaces or through other e-commerce should drive additional revenue. When this revenue is realized without proportionately increasing infrastructure expense, tremendous bottom line return is possible.

Total solutions: Do not expect that one software will answer all the company's needs. A suite of software assembled uniquely to fit the company's unique needs will be required. Having a well-documented list of needs and wants will help keep the system selection on track. When the goal of the project is well defined then the project is more likely to be successful. Beware the siren's song of technology. The software sales person is a master at showing the sizzle of a software

and it is very easy to get carried away and purchase more than what is really needed at the current time. Technology should support the desired direction of the company. The company should not become a slave to technology. To ensure the best possible return on investment, do not overlook the necessary education and training.

Everywhere: This connected world now provides the opportunity to purchase goods and services anywhere and everywhere. Cellular phones and PDA's now have the capability to browse the Internet and customers can make purchases. Choosing a system that is already web enable assists in capitalizing on these sales opportunities. When selecting a system, think about where the company will be 3-5 years into the future. Open architecture and standard web technology can help assure that purchases today will not be obsolete tomorrow.

Common Sense still applicable

Common sense rules guide a successful system selection for a company of any size.
Have a clear idea of what is really needed. What are you trying to accomplish? The features and functions of the software should enable capability that is not available today. How do processes need to change? Remember that technology and business processes are inextricable linked. As technology changes so must the business processes to drive the expected bottom line results.
Begin with the end in mind. Usually a company will not purchase everything in a system it needs all at one time. A phased approach is needed but having an idea of where the big picture is headed helps save money in the long run. Selecting a system and platform that can grow with the company helps make this possible.

> Does it make bottom line business sense? IT projects like any other business project should provide a bottom line return. In most companies the preferred goal is revenue growth rather than cost reduction since most companies are already running very lean. Recent advancements in technology are providing wonderful opportunities for small companies to compete with much larger ones.
>
> Do not overlook education and training. Education helps the affect people understand what is being attempted and why. Training provides the how. The very best technology can be purchased and without understanding the "what's, why's and how's", that investment may as well been put in the dumpster.
>
> Measure your success. The best measures are those that are important to the customer and the bottom line. A system selection and implementation should support the overall company objectives. A key requirement is useful information to enable these strategic decisions. Information is very different than data. Currently most senior managers are swamped with data coming from their installed ERP systems and starving for information. Without information decisions are made based on gut feel and the traditional ERP cost accounting data and not on what will drive real bottom line return.
>
> Every manager knows that all customers and suppliers are not created equal. However how do we know which customers are the most profitable? Which supplier is the best?

How can we quantitatively measure "the best"? This answer can only be determined in context of what is the goal and what is the company's constraint in reaching that goal.

Two measures that have recently captured many manager's attention are throughput dollar days and inventory dollar days. These measures combine the more traditional measure of throughput, inventory and time in a dynamic manner that quickly identifies improvements in internal response to customers and sets the stage for a collaborative supply chain. Throughput dollar days is a way to measure for late shipments by multiplying their dollar value by the number of days the shipment is late. The inventory dollar days measures is the other side of the balance that measures the value of inventory by the number of days it stays under the plant's responsibility. When both of these measures decline, the enterprise improves in its overall agility to the market.

Ten Steps to e-business Success

An e-business is an organization that connects critical business systems directly to their critical constituencies (e.g., customers, employees, vendors and suppliers) via Intranets, extranets and the World Wide Web. Inherent in that connection is a win-win value proposition for both parties. This is because only when a win-win value proposition is present can a real sustainable competitive advantage be realized. The early adopters of this approach have helped defined a proven path for becoming an e-business.

The ten steps that every business must consider on its road towards e-business are:

Step 1. Plan for change

Only one thing will not change in the near future and that is change itself. Just as tremendous change has already occurred in the last decade, the experts and futurists tell us that even more is to come. They project that we are currently in a disruptive change as significant as the Industrial Age. Available technology seems to be changing on almost a daily basis. At the same time skilled IT resources are becoming increasingly scarce. One study showed that over 20% of all potential IT jobs worldwide will go unfilled due to lack of available skilled resources. With all these changes in technology and applications, why would you want to waste valuable IT resources rewriting and debugging applications simply because the operating system has been revised? Why would you want to limit yourself to a single operating system that potentially could limit application choices in the future? Would it not make more sense to select a technological infrastructure that can morph with the state of the art applications and not require a major rewrite? Why not have a single server that is capable of running multiple operating systems simulataneously?

Step 2. Manage the performance of all your systems, networks and applications - as a single enterprise

Early in the days of computers in manufacturing, the computer aided design (CAD) systems could not directly connect to the computer aided manufacturing (CAM) systems or to the programmable logic controllers. Various stand-alone systems were used on the shop floor and frustration reigned supreme as these "islands of automation" limited the company's ability to

access information. Similarly today, there are clusters of servers dedicated to the UNIX platform for web serving, others dedicated for the Windows based applications (with backup servers for each application) and still others dedicated to mission critical business systems. Each cluster has its own management team and issues. The fast paced e-business world demands that information must flow seamlessly between systems and have these systems managed as a single enterprise.

Step 3. Overbuild for traffic

A recent UPS commercial shows a dot com startup company management team as they receive their first order on their web site. Quickly the order counter increases to 100, then 1,000 and then to tens of thousands. The dot com management team quickly realizes that they have a significant problem since they have insufficient logistics capacity to handle that volume. Similarly, as a company moves to becoming an e-business, extreme volatility is experienced in transaction loads on their servers. It does not make good business sense to purchase all the capacity it could potentially need in the beginning and at all once. Smart business people prefer to have capacity on demand available when needed and only pay for what is needed when it is needed. In addition, the market demands that the servers are always available. Even taking a server down to reboot to engage the capacity on demand feature is unacceptable.

Step 4. Identify all key subprocesses

Technology can only provide real bottom line return if it removes or expands a limitation that the company is facing to achieving its goal. The lesson of prioritizing and managing to bottlenecks was learned in the physical world of manufacturing. The same rules apply to the holistic world of managing the enterprise. If the business improves anywhere else but the bottleneck, then the investment can not drive a bottom line return since no additional throughput will be achieved. However, synergistic with the use of technology are business rules and subprocesses that must be addressed to be able to fully exploit that new capability. Simply implementing software without addressing the business rules and subprocesses is a guarantee for an expensive failure. Too many companies have purchased and implemented powerful (and expensive) software only to find that what they implemented looks exactly like how they did business before.

New software typically provide capabilities that the company did not have before. However, bottom line return is not possible unless the company exploits those new capabilities. In an ongoing company though, certain business rules were developed (either formally or informally) that allowed the business to succeed without those capabilities. Unless and until those business rules are changed, the new capability of the software cannot be exploited to benefit the enterprise. Taking a holistic view of the enterprise is needed to be able to take full advantage of the new capability that the hardware and software offer.

Step 5. Customer knowledge is everything on the web

The new gold standard for an e-business is customer knowledge. As more companies embrace technology, customers are increasingly demanding highly customized and personalized interaction. Customers do not want to be treated as faceless replicas. On the other hand, customers do not want choices either. They want what they want, when they want it and how they want it. Simple, right?

This is a big shift from the last decade where the focus was internal to the company. Most manufacturing companies focused on how to become more efficient and reduce cost. This is the promise that ERP held to the market – integrate your internal business functions and reduce costs. Some of the early adopters did achieve tremendous bottom line return. Upon examination these were very large, very divisionalized companies where a constraint to profitability was the lack of real time information across the enterprise. Since this is the core capability of an ERP system, it is not surprising that these companies drove significant cost reduction with the implementation of ERP. However, very few companies can achieve a significant bottom line return simply by focusing internally. This is exactly the reason that ERP failed to gain large market share in the small and medium sized companies. They do not have the same difficulty with information and business function integration as the large companies.

However, competitive advantage can be achieved for a company of any size when the enterprise extends beyond its four walls with a unique win-win value proposition that solves the customer problem. To be able to identify and solve a customer's real business problem, extensive customer knowledge is required. This means that the internal business management systems must be extended with supply chain (SCM), business intelligence (BI), customer relationship management (CRM) and e-commerce (ECM) applications to provide this meaningful knowledge. Once the knowledge has been gained, it must be leveraged to provide a real solution for a customer's real business problem to result in significant opportunity.

Step 6. Scalability, availability and security are not optional

The future is about growth. Growth of the business means growth of the infrastructure to support the business. Having to scrap applications and infrastructure because it cannot grow to support the business needs is a waste of time and money. This was covered in Step 1. At the same time, business processes are becoming increasingly reliant on computer availability and responsiveness. When the system goes down for any reason, your business goes down. If your business goes down, so does your bottom line. Customers do not care why the system is down; they only care that they cannot place orders and that your competition is only a click away.

Step 7. Integrate e-business with core operations from the start

The key word in e-business is connection. A common error is to have systems with manual intervention required to complete the transaction. Recent software development have introduced affordable connection software to trading partner for even the smallest company.

Step 8. Move quickly - at web speed

The advent of the Internet age has accelerated the unit of measure for time. Projects that were measured in months now take weeks. No longer can a company afford to spend two years implementing applications. It takes start of the art technology to provide the integration that enables rapid implementation speed and ease-of-use capabilities. Having the server always there and doing what its is supposed to be doing can drastically reduce implementation time.

The futurists are advising us that it will not be the big that will compete and win against the small, it will be the fast that will compete and win against the slow. Moving at web speed requires that

everything in the infrastructure does what it is supposed to do – not just 95% of the time but all the time – 24 hours a day, 365 days a year, year in and year out.

Step 9. e-business transition is the same priority as business priorities

During the ERP implementation decade of the 90's, the advice was that the project was second only to running the business. With e-business, this transition is the same priority as the business priorities because e-business is about transforming how we do business. Some writers still speak of the "new economy". There really is no "new" economy and "old" economy. There is only one economy and the same rules apply. The goal is to make money – now and into the future. Throughout this article, the interaction of technology with business rules has been stressed. Technology alone is not sufficient to achieve bottom line return.

At the same time, the business manager must be concerned with the technology rather than relegating it to the glass house. Too many managers base their technology decisions on what they read in the paper or hear from their colleagues. Back to the first question – what is the goal? If the goal is to purchase and implement the same thing as everyone else is – then this is an excellent way to make a decision. Many companies are purchasing proprietary software because it is so dominant as to be considered a standard. However this software then sets (and changes) many of the standards which then puts the company into a vicious cycle of having to expend scarce resources rewriting applications just to keep the business running. Open, standards based, systems are the choice of a company executive who desires to move to the future rather than rewriting the past. Looking for a platform that runs the major open functions and applications like C++, SQL, ODBC, Java, JDBC, XML, Websphere, Apache, MQSeries, Domino, Linux etc, is the choice of this executive. For too long the business executives relegated the platform decision to the IT staff, only to find out that this strategic decision locked into place constraints for the company's future. E-business is the way that the company will continue to survive and thrive into the future. The technology and business rules are synergistic and must be considered together to ensure that the desired vision can be achieved. This transformation is the priority as the business priority because this is HOW the business will be successful in the future.

Step 10. e-business is as much about vision as technology.

As Lou Gerstner said, e-business is not about technology – it is about how business is being transformed. Even with the very best technology, software and integration services, without a context of what is the desired vision and what that vision will mean to the company's future, success will not be achieved. Think about the necessary conditions to create a fire – you must have fuel, an ignition source and oxygen. The same logic applies to becoming an e-business. An e-business requires vision, aligned business rules and supporting technology. The technology is the relatively easy part. The most difficult part is clearly identifying and articulating the unique win-win value proposition that the company can offer to its customers that solves the customer's real business problems. This is the vision that provides a context for everything else that is accomplished.

Summary

Technology is changing at an increasing rate. However with the above approach, every sized company can feel confident in their ability to successfully select and implement the right systems. The challenge lies in elevating strategy and exploiting the constraints to achieve that strategy beyond focusing on implementing and re-implementing ERP systems. Remember that the constraint can be a physical one like production capacity or a procedural one like established business rules. When the context has been established then the information can be provided so that managers can make informed decision about which road to follow. As the Cheshire Cat said so well, the road does not matter if you do not know where you are going.

Best Practice in the Automotive Industry
Supply Chain Management Based on the Toyota Production System

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Abstract
This paper discusses structural changes to the automobile industry that were brought about by the advancement of Information Communication Technology (ICT), as well as two major issues in the supply chain management of the industry, namely, "agile vehicle development and production preparation" and "agile production and delivery responding to customer orders." Information sharing with business partners through digital engineering is the first step in the application of ICT to automobile business processes like new vehicle development, production and sales. Toyota is carrying out its supply chain management as part of the improvement activities on "human creativity" which is the basic principle of the Toyota Production System. This paper introduces some examples of the corporation's supply chain management activities, such as "V-comm" a collaboration tool, and "TLSC."

Keywords
Supply Chain Management, Just-in-Time, Kaizen, Visual Management

1. Introduction

The automobile industry is now entering a new epoch. Many auto manufacturers are merging and forming partnerships to create a new structure for the industry. The very survival of these manufacturers is at stake as they are facing many crucial challenges, including environment issues, globalization, harsh competition in the global economy and more. All these structural changes to the industry can be justly ascribed to advancing information technologies and the ever-spreading Internet. The Internet, enabling the distribution and sharing of information worldwide, is pushing businesses to grow more global and become more open-structured, and to further speedup their operations.

In this paper, I will first summarize the current situation and trends relating to the structural changes in the automobile industry that have been promoted by ICT. Then, I will describe some examples of how we should develop our own supply chain management based on ideas much like the Toyota Production System. I will focus on two aspects of this issue, namely digital engineering in new vehicle development and the Just-in-Time system for the customer. This discussion is based on the proposition that the automobile industry is another kind of information processing business that utilizes human resources and ICT. It emphasizes that the Toyota Production System- which focuses on the creativity of workers and the vitality of the organization- should continue to serve as the foundation of our supply chain management, even as ICT evolves further during this new century.

2. Automobile Industry in the Age of ICT

2.1 Challenges that the automobile industry faces

The most serious challenge the automobile industry is facing comes in the form of its response to global environmental issues. Automakers all over the world are shifting their focus from gasoline, which currently accounts for some 30% of the world's crude oil consumption, to new zero-emission energies. These manufacturers are busy trying to develop fuel cells and other new sources of energy, and this technological competition is accelerating the formation of alliances among the world's automakers. Yet another task the automobile industry has to accomplish is the creation of a recycling-based production system which integrates every process from the production of products through their disposal. The world's finished car manufacturers, or Original Equipment Manufacturers (OEM) are required to secure the business resources needed to develop these environmental technologies and to handle their production capacity surplus, which is believed to amount to some 20 million vehicles in total. No doubt all these OEMs will resort to further M&As in their effort to survive in the future.

In this new century of ICT, what were formerly business groups united around physical organizations should evolve into logical unions based on an information-sharing environment of networks. In other words, more and more businesses, including the automobile industry, should form such global alliances or “Virtual Enterprises”, which share core technologies to carry their operations and organizations forward across chronological and geographical boundaries.

2.2. Structural changes in the automobile industry accelerated by the digital economy

A report issued by the U.S. Department of Commerce- which frequently used the term "digital economy"- said that the expansion of the Internet and the digital economy are changing the very structure of industries. In the U.S. auto industry- referred to as "typical of all the manufacturing industries" - GM, Ford and other OEMs are no longer just producers of vehicles, but instead are transforming into providers of automobile-related services.

True, the production of finished automobiles, just like that of PCs, carries very limited value added. In the course of the total value chain, running from the "upstream" of production of components and parts, through the "downstream" of vehicle sales and related services, there is only a small profit to be gained by OEMs. Though there are some differences between the PC and auto industries, in both of these industries the finished product assembly lines carry lower value added than the "upstream" and "downstream" sections do. And such assembling is expected to produce diminishing added values in the future. Today, OEMs producing finished automobiles create 25% of the total added value an automobile carries, while the "upstream" component and material manufacturers create 30%. The remaining portion of the total value added, according to the report, is ascribable to the service section, including sales, accessories, insurance and others. It is only natural that OEMs, whose major business is designing and assembling finished cars, are now trying to reach out to their corresponding "upstream" and "downstream" operations.

The modularization of car components is forcing some OEMs today to shift their operations to the "upstream" section. Also, the "downstream" section now covers not just

automobile production and sales but the whole car-related lifestyle, as suggested by the ITS (Intelligent Transport Systems). Such trends in the digital economy should eventually lead to drastic changes in the world's automobile industry, though currently there still are some cultural differences between the automakers of North America, whose top priorities are on brand building and business channels, and their counterparts in Europe and Japan, whose emphasis is on the quality of the products.

2.3 Creating new business models

The expansion of the Internet has nurtured the rise of a new kind of venture business, those who make the most of information networks. The initial fervor of what was referred to as the "Net bubble " is over now. Amazon.com is the largest web bookstore in the U.S., and Autobytel has initiated a whole new trend in automobile sales. These successful examples prove that a new Internet-based business model can overturn, in a short period of time, the order of supremacy in specialized businesses built up over a long period of time.

The emerging force of Internet businesses, often referred to as "dot com firms," has no doubt stimulated the older ones, called "T (Traditional) businesses," in their respective industries. Some examples of this are Amazon.com vs. Barnes & Noble; Dell vs. IBM and Compaq; and Autobytel vs. automobile OEMs. GM is now known for its IT-powered customer service for car owners. Those services, provided by systems named GM-Access, BuyPower, OnStar and others, were deployed in the middle of the 1990s. Toyota is in no way lagging behind. We are accelerating our e-business initiatives and programs, as shown by Gazoo (gazoo.com), which is a Web site providing ITS and e-commerce services, services available from mobile communication terminals, and many other new features. In terms of business reform, we have been taking new steps in digital engineering, supply chain management and other e-commerce programs.

2.4 Deploying virtual enterprises

Japan's automobile industry is structured vertically: OEMs are positioned at the top of the hierarchy, with the primary, secondary and other component providers placed below them. Yet global competition is rendering such a closed, hierarchical structure meaningless, inefficient and outmoded. Business practices and rules peculiar to OEMs are no longer accepted. The whole auto industry is required to comply with the EDI or other standards of business that are employed by the majority of the world's auto industry. The Japan Automobile Manufacturers Association is now trying to deploy JNX, a Japanese counterpart to ANX, a Virtual Private Network (VPN) deployed by the AIAG (Automotive Industry Action Group) in the U.S. This marks the first step of the Japanese auto industry's progress toward more open and global business models.

In the last couple of years, we have been witnessing the emergence of more and more B2B Web sites, where corporations sell products to consumers. A kind of electronic marketplace (to be called "E-MP" hereafter) is appearing in one industry after another. Japan's steel industry has "Kouzai (steel materials) dot com" (www.kouzai.com) and the construction industry has "Construction ec com" (www.construction-ec.com). Though it still remains uncertain whether many of the E-MPs today will be successful, they have the potential to promote virtual enterprises centered around E-MP.

A new E-MP plan, called Covisint (www.covisint.com), was kicked off by the "Big

Three" U.S. auto makers and other participants last year. This E-MP lets the participants procure automobile components over the VPN and tries to integrate all the corporate activities into an information system, covering component and material procurement through development, production and distribution. The goal of this plan is the same as that of CALS (Continuous Acquisition and Life-cycle Support) originally proposed by the U.S. Department of Defence in 1985 and is aimed at creating an environment for information sharing among business partners. Although these two projects have different emphases- i.e., CALS is meant to serve as an environment in which participants share product designing data, while the fact that many E-MPs started with parts procurement suggests that information environments where virtual enterprises can be formulated and function in the digital economy should arise- whether such projects will prove to be successful in the short run or not is still unclear.

(Note: The author of this paper participates in ECOM (Electronic Commerce Promotion Council of Japan) as a chairperson of the Planning Committee. ECOM is Japan's largest NPO involved in studies and research on e-commerce. ECOM, whose Web site is www.ecom.or.jp, began its CALS studies in 1995 and is currently conducting research on business models, supply chain management, E-MPs, and more.)

3. Supply Chain Management in the Automotive Industry

3.1 Two critical issues of the supply chain management

In the automotive industry it has become more critical than ever to deliver the products that customers need on a timely basis. The first issue is agile product development and production preparation. The second one is agile production responding to customer demand. Two circles of Figure 1 show the business process which seeks to eliminate the lead-time.

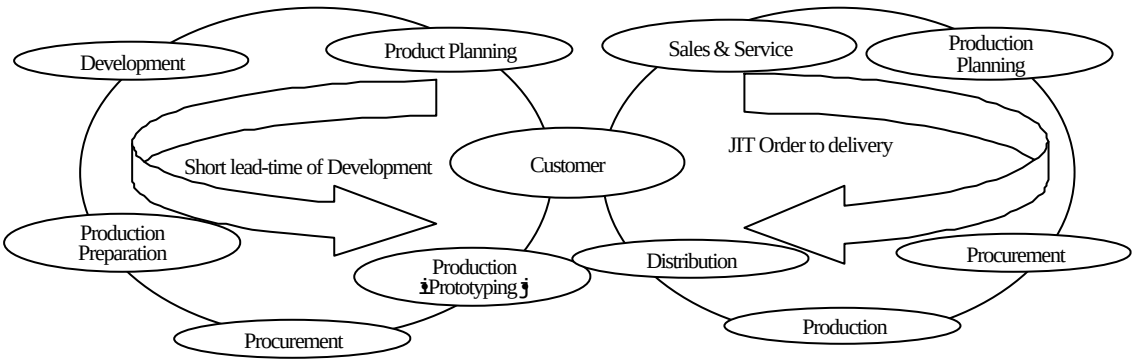

Figure 1. Two critical business processes in the automotive industry

The left stream “From customer, product development and production preparation to production” represents the development of new auto models. The lead-time of development of a new model at nearly all Japanese car manufactures is less than 20 months. In this stream, it has become more critical to introduce digital engineering through data sharing and unification of development information among business partners to develop products and production processes.

The right stream represents the flow of customers' orders from customer to production and delivery. The terms "Supply Chain (SC)" or "Supply Chain Management (SCM)" usually references to this stream. At Toyota this stream from customers' orders to production and delivery is executed based on the Toyota Production System (TPS). The term "SC/ SCM" which was initially used in the U.S. from around 1990 originated in Just-In-Time (JIT) as one of the basic concepts of the TPS. But SCM empowered by modeling and simulation technology is applied effectively as the planning stage of the business process rather than the execution one.

3.2. Collaborative work and digital engineering with business partners

In order to shorten lead-time and cut costs in the product development process, we involve suppliers in the early stage of development and work with them closely. Also the manufacturing divisions and quality assurance divisions get involved in the development process early and in the prototype stages. Cross-divisional teamwork helps maximize product quality. Optimizing part designs is especially important in attaining cost targets. Design, purchasing and manufacturing divisions work with suppliers' engineers and designers to work out part designs that offer the required quality and performance while meeting cost targets.

In the product development process, it has become more inevitable to apply digital engineering as virtual communication, as well as physical communication, such as face to face meetings. One of the digital engineering systems applied at Toyota is V-Comm, which stands for "visual and virtual communication". It allows the sending and reception of still/moving images and voice among each of the concerned sites through the application of conventional TV conferencing and Visual Communication Services. It is useful for checking out in real time any problems that appear at remote sites, identifying the causes of the problems, and figuring out how to handle them. Then we turn to our 3-D simulator, which converts and processes CAD data into clear relief images projected on three 100-inch screens. With the simulator, we can view simulations from a variety of angles showing final configurations as well as the movements of multiple components when assembled. For example, it will be possible for suppliers to make sales approaches based on configuration data without the need to build prototype products.

Figure 2. shows front-loading of man-power for the product design and production preparation in the product development process. Concurrent engineering using such tools as V-comm with collaborative work among business partners enable us continuously to develop multiple models of vehicles to keep up with fast-changing and increasingly diverse customer needs. In the automotive industry, the key to success for SCM depends more than half on the product development process.

3.3. Agile production and delivery responding to customer order

In this business process as production and delivery Toyota has established JIT based on TPS drawn later. The basic philosophy of TPS will be constant even if the

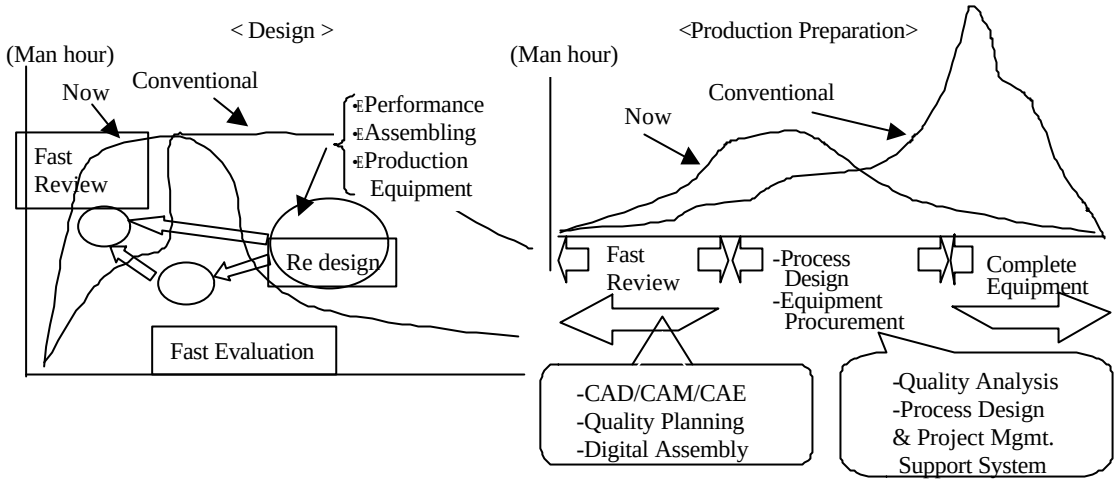

Figure 2. Front loading of man hour in the design and production preparation

manufacturing environment changes in the future. But ICT has dramatically advanced since the establishment of TPS around 30 years ago. In that sense TPS has become advanced and evolving, applying ICT such as V-comm. Now JIT activities are expanding globally from customers to suppliers based on human resources useing advanced ICT.

But in order to gain better customer satisfaction and to realize “Build to Order” manufacturing in the near future, it becomes more critical to integrate data from customers’ orders, production, suppliers’ parts delivery, vehicle delivery and information sharing with business partners. Toyota’s “Customer in project” is an approach to providing customers in a timely manner with vehicles that earn their satisfaction.

4. The Toyota Production System (TPS) and its evolution

4.1 Basic idea of TPS

TPS, which originated in the production process, is now corporate philosophy, and is sometimes described as Toyota’s DNA. In the economic recession after the bubble economy, what should be emphasized was a return to the origin of the TPS based on human ability and activities. Now the basic idea of the TPS has been introduced to the product development process, and also to the marketing & sales process. In the ICT era, empowerment of human ability will become a more and more critical issue. It is necessary to enhance the production system as well as engineering and business systems that are brought together by the synergy of Kaizen (continuous improvement) and innovation based on human creativity.

The concepts of TPS consist of two pillars, JIT and *Jidouka*. Toyota uses the three methods below to efficiently accomplish the TPS objectives of high quality, short leadtime, and high productivity:

- The pull system
- Leveled production
- Continuous flow processing

The JIT concept provides for producing only what is needed, only when it is needed, and only in the amount needed. Now, the term “producing” is expanding to other business processes as “delivering” and “doing business”.

Jidouka means "autonomous automation," under which machines stop automatically when an abnormality occurs. *Jidouka* refers to an autonomous system in which a machine, line and process harmoniously coexist with humans, responding to changes in the manufacturing environment. By stressing these ideas using the previous three methods in each production process and delivering one item, we eliminate waste, including wasted time and effort as well as wasted materials.

4.2. *Jidouka* "autonomous automation"
Just-In-Time production comprises the most visible elements of the TPS. It therefore receives the most attention in most descriptions of production at Toyota. Just as important as Just-In-Time, however, is the principle of *Jidouka*. It originated in Sakichi Toyoda's invention of automatic looms that would stop automatically whenever any of the threads broke. Today, the principle of stopping work immediately whenever a defect or abnormality occurs is fundamental to TPS.

We design our production equipment and systems to detect abnormalities and to stop automatically when they occur. And we equip our workers with means of stopping the production flow wherever they note anything suspicious. This mechanical and human *jidouka* prevents defective parts from progressing into subsequent stages of production, and it prevents the waste that would result from producing a series of defective items. It also prevents major mechanical breakdowns, since the equipment stops before the problem becomes serious.

4.3 Just-in-Time thorough pull production and continuous-flow process
Kanban, which is a card for a production information tool for visual management, is indispensable for operating the JIT system. To implement the production plans efficiently, we must keep our vehicle assembly plants supplied with more than two thousands kinds of parts. Supplying those parts to the assembly lines in a timely manner is the key to achieving short lead times in our production. We do that by operating our production format as a "pull" system.

A smooth production flow is the most important consideration in arranging the production processes. To maximize efficiency, we must seek an efficient flow in the overall stream of production – raw material, machining and assembly –and also in the work handled by each individual worker. Items must progress one after the other through the production sequence in a smooth, continuous flow. The pull system is an excellent way to minimize inventories and prevent waste. But its efficiency depends on transporting parts in an orderly and timely manner. In order to realize a more optimal supply chain from customers' orders to production, our kaizen activities for JIT are expanding to our business partners, including parts and vehicle deliveries.

4.4. The kanban system
The kanban system just for parts procurement and logistics control is an autonomous distributed system, compared with the typical parts procurement system such as Material Requirement Planning (MRP). This is because the kanban system based on the "pull system", depends on human operation, The authority of kanban control is given to the shop floor in order to meet the real changes of production. In order to realize the pull system effectively using kanban, the following conditions are required:
- Less fluctuation of parts ordering volume

- Consecutive consumption of a set amount of parts
- Short lead time on parts delivery

The control parameters of kanban operation are as follows:

- Number of kanbans in circulation
- Lot size of parts in one container or pallet
- Kanban cycle (the number of parts delivered per day and the conveyance lead cycle)

It became difficult to maintain the conventional kanban system based on human operation in a vehicle manufacturing environment in which the variety of vehicles and parts had increased rapidly. The pull system using kanban is controlled by self-adjustment of the circulating speed of kanbans rather than request changes in the number of kanbans in circulation.

When Toyota constructed a new assembly plant in Kyushu (southern island of Japan) to which parts were shipped from the general vicinity of Toyota headquarters, we introduced a kanban system enhanced by ICT to realize the pull system with a long conveyance lead time. Now Toyota has introduced e-Kanban system (Toyota Parts Procurement System) keeping the basic principle of the conventional kanban system based on the pull one. The following technology was introduced:

- Logistics information system to realize an efficient mixed conveyance
- Parts ordering system with automated leveling of the number of kanbans
- Electronic settlement of accounts with no written of parcel
- Automatic issuing of kanbans

Newly developed e-Kanban systems feature the real-time issuing of kanbans based on the sequenced customer's order at the assembly plant.

5. Best Practices in the SCM

5.1. ICT and the human role

In Japan, acronyms such as SIS, BPR, CALS, ERP, SCM have been frequently referred to in the IT business. They sound like buzzwords of IT business strategy. ICT has rapidly become advanced and sophisticated, and new ICT-based reengineering concepts and methodologies for business processes have been introduced more and more every year. But we must recognize that the main role of the business process is not only the ICT or new concepts for reengineering, but also human creativity itself. In Japanese industries we have experienced several unsuccessful examples of introducing ERP or SCM software packages. To be sure, SCM will become more important rather than JIT in the ICT era. But we should recognize that higher productivity and better business processes can be realized through the synergy of Kaizen and innovation, in other words, the synergy of humans and technology such as ICT or automated machinery.

We have experienced a big gap between the human-oriented system by Kaizen activities and the ICT oriented one. The former is more accessible, flexible, changeable and more collaborative than the latter. Taking into account the basic factor of human nature, which says that people look for satisfaction in their jobs, we are pursuing ways to provide better working environments to make jobs more interesting and to motivate employees.

5.2. Business process visibility for better SCM

In order to improve the business process based on the TPS it is important to visualize related business processes for information sharing. Business process or manufacturing process are advanced and evolve with synergy of Kaizen and innovation. This synergy is

provided by the creative activity of people involved in business processes or manufacturing systems. Many of the people involved, such as engineers, designers, managers, operators, maintenance staff and system vendors, as well as many organizations are involved in business processes or manufacturing systems. In order to gain the creative knowledge necessary to improve or innovate the system it is essential to visualize business processes.

Each organization or company has visualization methods, tools and modeling methodology. The expression methods and description procedures for visibility have many variations due to the multiple view-points of business processes involving for example, materials, information, organization, resources, function, location, sequence, and time. Figure 3. shows an example of visualization methods used at Toyota for more than 10 years.

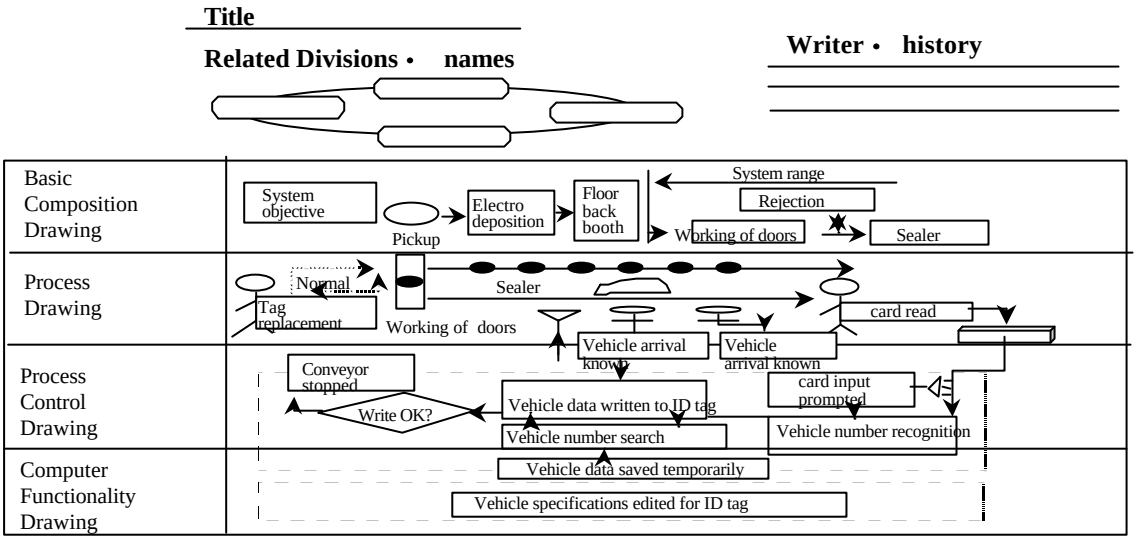

Figure 3. Visualization methods for the business process

The Total Link System Chart (TLSC) named at Toyota enables all the relevant partners to discuss and verify the system. TLSC expresses process-related items as follows in one format:

- Process control basic drawing: overall concept and diagram
- Process drawing: process plan and design
- Process control drawing: electronic circuit and equipment drawing
- Computer functionality drawing: information process design

Upon taking the scope and the types of systems that will be described by TLSC into consideration, we defined only those with a high level of commonness or importance using easily understood expressions. An area that we took into special consideration was to prescribe the movements of the people, processes, and malfunction corrections apart from others. This results from the perspective that it is important to render the roles of the people within the system visualizable, as we take into consideration the need for reducing the number of people or for providing a backup in case of a malfunction.

TLSC is one solution to help visualize the process and process related items, for production and logistics. Currently, this tool is utilized in practically all automotive

production processes and logistics. Especially for better supply chain management among multiple business process, TLSC enables us to enhance kaizen activity and innovative business process.

5.3. An example of kaizen activities based on TLSC

I discussed TLSC as meaning "Business Process Visibility," which inter-links a supply chain and the systems related to it, and thus enables the participants to share information. Below, I introduce the second step of employing TLSC in component distribution. This step makes use of digital engineering technologies to visualize and quantify the business processes, with a view to the reform and enhancement of such processes and their efficiency.

(1) Expressing current processes and their situations in models

Digitalization tools (distribution simulators) express in digital models the current volume of products distributed, their costs, etc., utilizing models of the affiliated manufacturers and the distribution flow lines created by TLSC.

(2) Analysis

Figure 4. shows a simplified model of distribution activities among manufacturing factories A, B, and C. The model suggests there are some redundant, overlapping distribution processes among those manufacturers.

To reorganize the routes of component distribution, each route is quantitatively analyzed using simulators. Their loads, and frequencies, as well as the practical operational and restrictive conditions, are evaluated.

(3) Determining improvement and reform plans

As described above, after analyzing the visualized digital models of the current distribution system, several scenarios for reforming and improving the system are created. They then choose the best scenario that accomplishes the improvement targets desired. In this step, the parties involved verify the targets and evaluate the scenarios proposed. In these efforts, TLSC and other digital engineering technologies prove their might.

In this example, the scenario collects all the components carried into a distribution relay station (called the "cross dock), from which they are delivered to the factories. The simulation system lets the participants evaluate how beneficial this scenario is in a quantitative manner.

Finally, the participants determine the improvement and reform plan of implementation, considering all the business factors, and begin to build the actual distribution system.

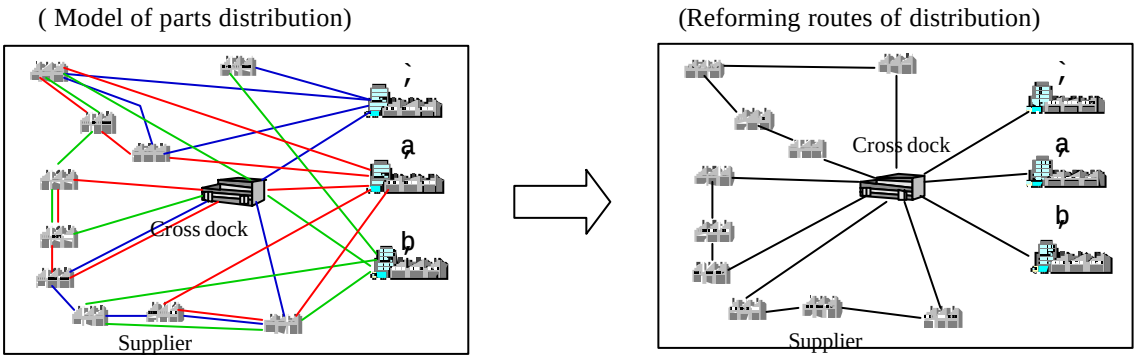

Figure 4. Kaizen activities using TLSC and digital engineering

As the example above shows that uses “TLCS” and other “information tools” is very effective, especially when it covers a large geographic area, a long time span, and involves many affiliated businesses. In such a case, the parties involved should be able to see a comprehensive picture of the entire system, understand its objectives, and avoid having wrong pre-suppositions and misunderstandings about the system in analyzing it.

At Toyota, the personnel concerned take the initiative in carrying out the process of reforming, from the investigation and analysis through the scenario creation and choosing of the final improvement and reform plans for implementation. In supply chain management, it will be increasingly important for the many people involved to develop creative ideas during the planning stage through information sharing and the utilization of information tools as a means of doing so.

6. Conclusions

The automobile industry consists of countless complex business processes, these include procuring the materials and components, the production and sale of finished products, services and much more. Now, the advancement of ICT is introducing changes to the industry's structure and the way people work within the industry. Many Japanese manufacturers are applying SCM software to production and distribution planning, hoping to achieve the best business practices. Still, since the Japanese auto industry has many layers and branches in its structure, building the optimum supply chain in the industry involves many people and organizations. Prior to implementing SCM software and other tools of ICT, it is necessary to share information with business partners and make the business processes visible.

One principle of Toyota's SCM is "Just-in-Time," which is also one of the principles of the Toyota Production System. The focus of this production system is on human creativity and people’s desire to improve. Today, the progress of ICT is enabling TPS to evolve even further. The best practices in Toyota's supply chain will make the most of ICT as a means enhancing the creativity of the corporation's human resources and their desire to improve. The Toyota Production System, whose principles include Just-in-Time, autonomous automation, visible management, elimination of waste, and others, should remain the keynote of the best practices in the corporation's supply chain activities.

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Supply Chain Management in eBusiness World

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Business Transformation in New Economic Era

In 1997 the Fortune 500 was announced. Two motor companies, Ford and General Motors, occupied the first and the second place. Chrysler Motor placed 7th. The total sales amount of the three motor companies combined was $40 billion. This result was not surprising. The most surprising fact was that the three motor companies stock amounted to less than 3/4th's of Microsoft which was the 137th on the list. The market value of Ford and General Motor together was equal to Intel's. Industries in Taiwan are in the same situation. Old companies are just not as valuable as new enterprises. TSMC market value is higher than Cathay Insurance, UMC market value is two times of Taiwan Plastics's market value. Old companies save properties for decades or centuries. However, they were easily surpassed by new enterprises. We call this situation the "new economy era". Former U.S. President Bill Clinton identified the new economy era: "The new economy is an economy that's fueled by technology, driven by entrepreneurship and innovations." This means that in the new economy era, enterprises must operate with pioneering and innovative spirits, and use technology as much as they can.

IT application in manufacturing industry

In the early stages of computer system applications, the applications were "Island Systems" without integration. In the early 1980s, the manufacturing industry adopted the MRP system for controlling costs, raw material preparation, purchasing, and scheduling. In the late 1980s, financial managing was highly respected. The managing points focused on cost managing, sharing, and the establishment of "cost centers." The cashier-like financial manager became an important role to take in managing costs and financial leverage applications for enterprises. Then, the ERP system came into the spot light. In the new ERP system, MRP operating procedures were not only corrected and enhanced, but integrated financial, accounting, and cost functions were also added. The ERP system became an essential condition for enterprises to compete, and even became a standard for enterprise exam vendors.

MRP, MRP II, and ERP systems are all post-order systems. In the late 1990s, the global Demand and Supply markets formed, and with this came global competition. To control and predict global needs, the ability to see and promote supply capabilities became the competing axis. Due to this, the need developed for applications which extended to the planning of Demand/Supply. Here, Supply Chain Management (SCM) became the star of tomorrow. SCM and ERP integrated a wide range of managing functions like predicting demand, planning supplies, managing material, producing, manufacturing, deploying, inventory, and even selling. As the resources, procedures, and functions grow, SCM continues to become even more complicated than ever before. The main functions include:

(1) Supply Chain execution (SCE), includes Warehouse management, transportation management, order management, International trade logistics, and sourcing.

(2) Supply Chain Planning (SCP), includes supply chain design, demand planning, supply planning, manufacturing planning and production scheduling as shown in Chart<1>.

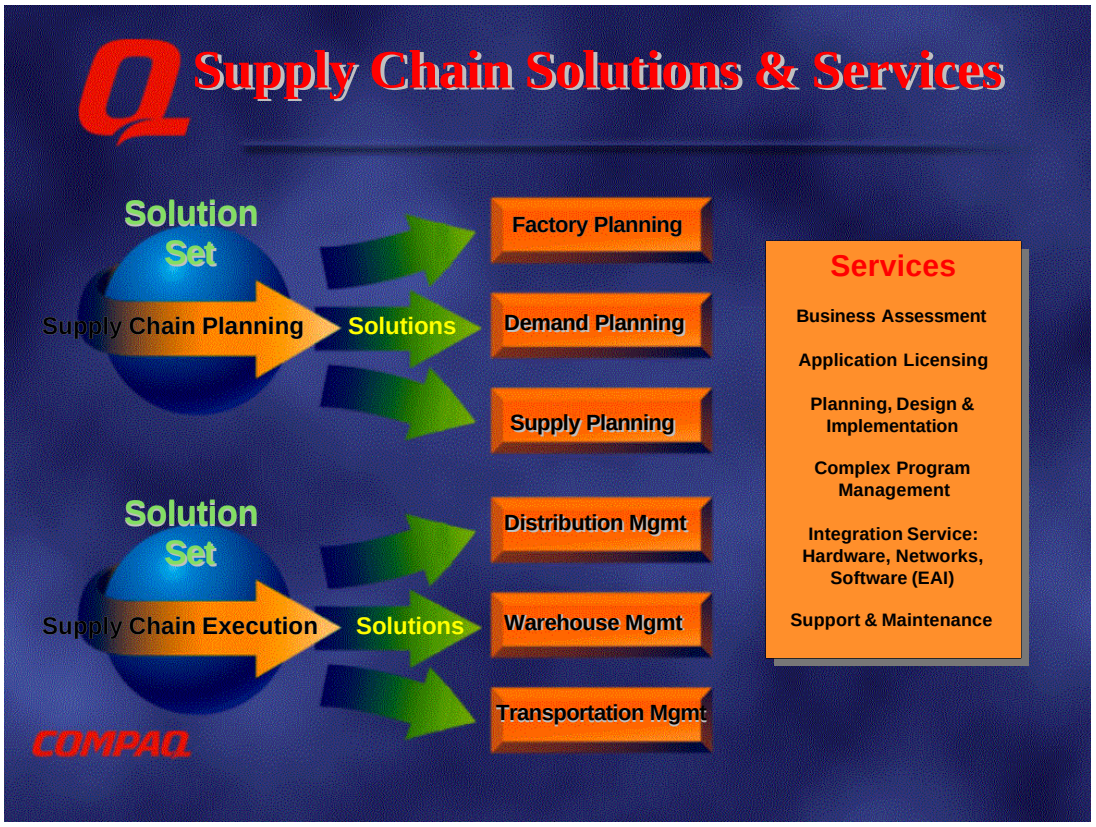


Chart <1>

3. Global Logistics by Collaboration

Globalization, growing competition, and the fast development of Internet technology and IT, are dramatically changing the ways enterprises form their competitive strategy. The main Internet forces are listed below:

(1) Internet development forms Industry revolution.
- IT changes the way we work
- Digitalization changes product and service style
- The traditional market is flowing away
- Internet changes the ways of communicating

(2) Internet development changes competing methods
- Breaking the border and substantiation
- Greatly lowering channel costs.
- Real-time Interaction.
- To Track users' behavior.
- Agency value lowered, or even eliminated

(3) Internet economic challenges
- Low cost economic scale

- Learning curve shortened
- Information minding application on economical intelligence
- Real-time control

With the entry barrier of having internet access “anytime, anywhere,” greatly lowered, personalized “one-to-one” marketing has become possible and popular. Along with this, the demand forspecific and configured products has also increased. Thus, the application of Internet technology for customers is no longer restricted to an operating process or to level up the operating efficiency, but creates a new business model. It also gradually becomes an enterprise’s core competence. Enterprises using technology to integrate up-stream and down-stream B2B eventually lead to the development of, global value chain management. Collaboration among enterprises could be built to integrate different Supply Chains as shown in chart<2>.

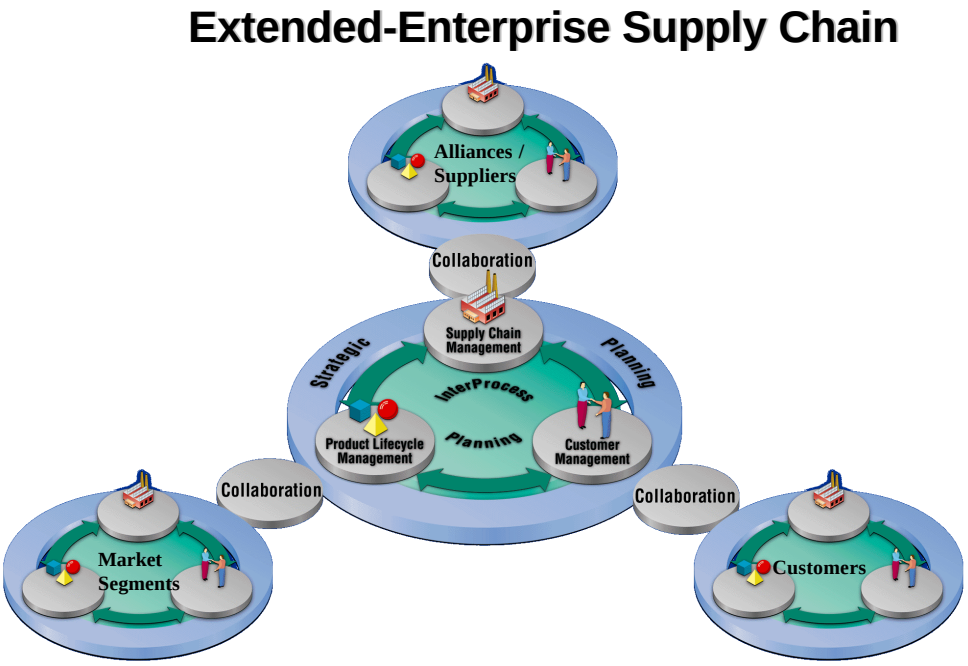


Chart <2>

The challenges “High-Tech” industries have met and the Proper responses to those challenges

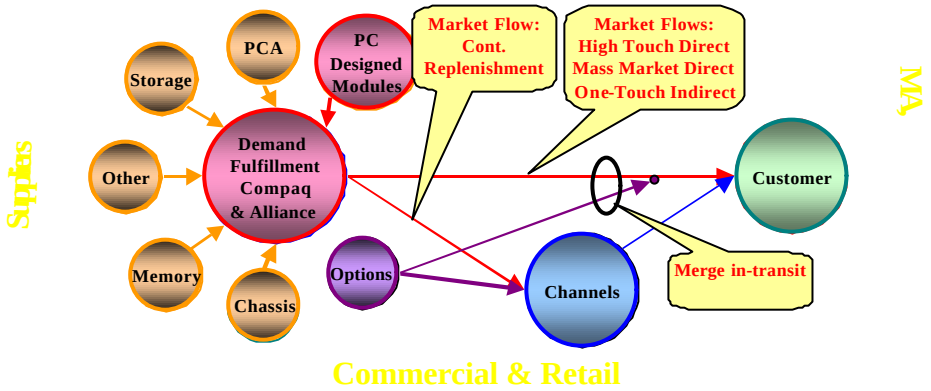
For each competing vendor’s boost in technology, the benefit lessens and the product life cycle is shorter. Because of this, the response time needs to be short. It is important to control market demand and respond to it quickly. To promote competence and lower costs, “high-tech” industries have several methods they can choose from:

(1) Lower costs by outsourcing activities like fulfillment logistics or manufacturing, but make sure to control the business flow.
(2) Shorten time-based work. For example: planning, production cycle time, vendors’ lead-time and time-to-market.
(3) Control product life circle time more precisely, planning ECO managing functions

from start-up to retirement.
(4) Compress cycle time through automatic order fulfillment.

The cooperating Hi-Tech industry operating process would be:
(1) ECN management
(2) Possible use and management of substitutes.
(3) Material supply management.
(4) Through substitute management it is possible to develop feasible supply scheduling and management.
(5) Different sources/modes planning.
(6) Unshipping orders and shipping list management.
(7) Vendors' shipping peak and order separating management.
(8) Schedule-based secure inventory management.
(9) Product-in-process substitute management.

Hi-Tech Supply Chain Requirements



- **A best-in-class Supply Chain provides a sustainable competitive advantage**
- **Supply Chain deployment decisions need to comprehend a balanced set of criteria.**

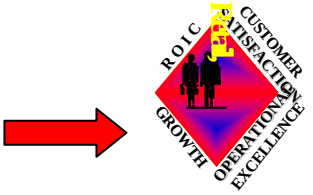


Chart <3>

When using the Internet and E-commerce, it is possible to operate the enterprises in "Zero-latency mode." Zero-latency means to exchange information and respond to customers-market needs in time in different areas, with different technology and under different organizations. The different organizations mentioned here are no longer different departments in one enterprise, but different departments in different enterprises. Enterprises' Suppliers and Customers are included.

The Problem Statement

- Maximizing Customer Satisfaction & Profits through optimization of Inventory Level, Product Mix, Re-order Cycles & Production Lead-time

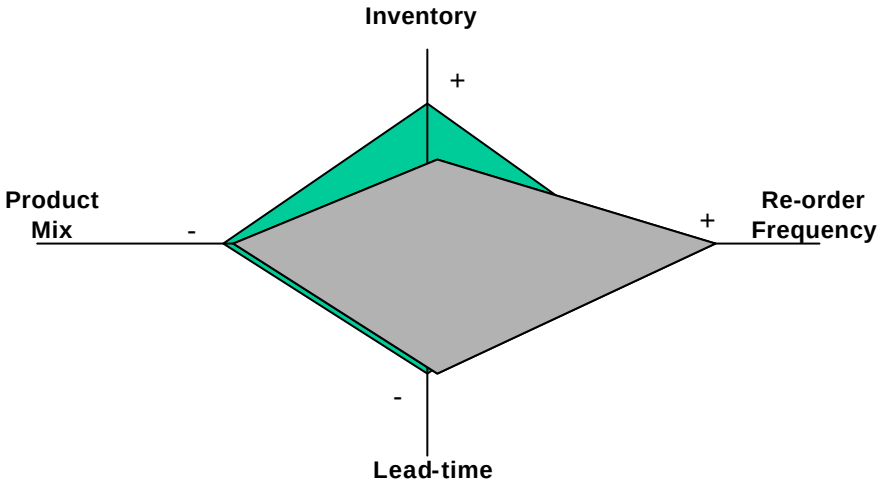


Chart <4>

In order to maximize profit and customer satisfaction, we have to adjust the inventory, product mix, order planning, and production time to the optimal situation. Theoretically, these four segment surfaces take fixed parts on four quadrants. (Please notice that the lead-time and product mix are minus, the lower it moves the smaller it gets.)

Global logistics aims to lower inventory, perhaps even down to zero inventory levels. The other three segments must adjust to fit this situation. See Chart 5 for reference.

(1) To lessen product mix is to use standard equipment parts, unfinished products and models more.
(2) The Increasing re-order frequency part, is the place where IT can assist. Using the Internet, it is possible to combine the upstream and downstream supply/demand information. The re-order frequency could be shortened from once or twice a month to once every hour or once every minute.
(3) Using the enterprise's SCM to shorten the production cycle time.

Squeezing the Model for Profitability & Customer Satisfaction

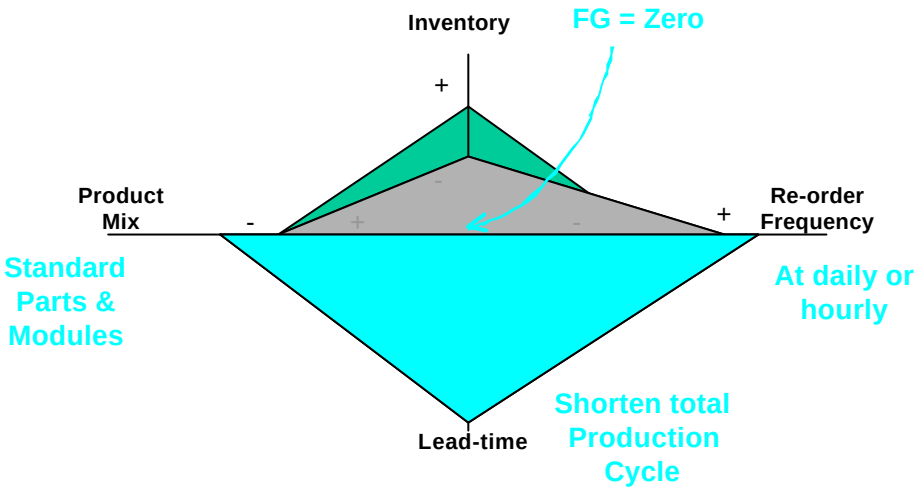


Chart <5>

The benefit of SCM

While planning the SCM, enterprises hope to promote benefits on both operating and service aspects. The benefits on promoting operating process are:

- Lower inventory cost
- Lower over/useless inventory cost
- Faster Inventory turn over time
- Lower overhead cost

On service aspect, the benefits are:

- Promoting order commit cycle times in less than one day.
- Lower inventory cost but better shipping rate.
- Lower inventory cost but better shipping date.

In the operating process, the operating changes are below:

FROM	TO
Product Cost Focus	Lowest total delivered cost (measured at end customer)
Source cost	Inventory turns in total supply chain (supplier through channel)
Inventory turns	Responsiveness to customer demand
Factory utilization	Leadership commodity costs
Commodity cost	Flexible, efficient, and responsive manufacturing
Logistics cost	Seamless information systems inclusive of OEM
Low barriers to entry (25% "no-name" suppliers)	

Factory to factory
Factory to supplier
Factory to customer
Customer to supplier
New business roles for improved flexibility
ROIC measure for manufacturing

Some Hi-Tech industries gain benefits on these aspects for example:
(1) A company can benefit from.
(a) Higher inventory turn over time. From once every ten years to 180 times every year.
(b) Inventory amounts lessened from 35 days to 2 days.

Global logistics and its advantages

In additional to inter-company supply chain management, there is another technological approach for cross company collaborations which integrate supply and demand across enterprises. Integration among enterprises used to be difficult to implement. Technical and security problems are involved. However, for the innovation of Internet, across-enterprises integration is no longer difficult. The enterprise collaboration environment is constructed within the Internet. See charter 6 for reference.

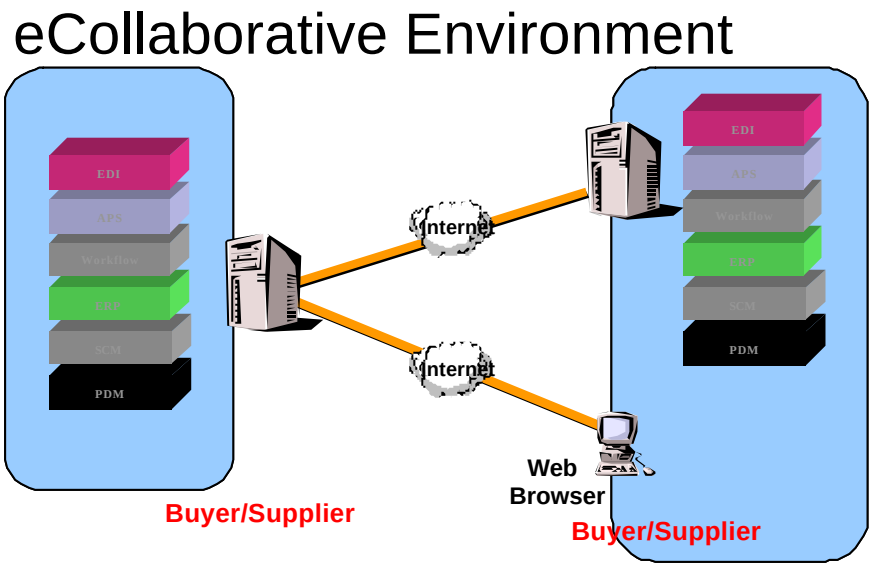


Chart <6>

There are four parts in the collaboration referring to supply and demand. They are process collaboration, design & manufacturing collaboration, supplier-demand collaboration and Internet procurement.

Through the integrated process, process collaboration creates a request/demand information flow among suppliers and customers. With the identification of public processes and private processes, the whole procedure can be integrated and security/authority can be identified. See chart <7> for reference.

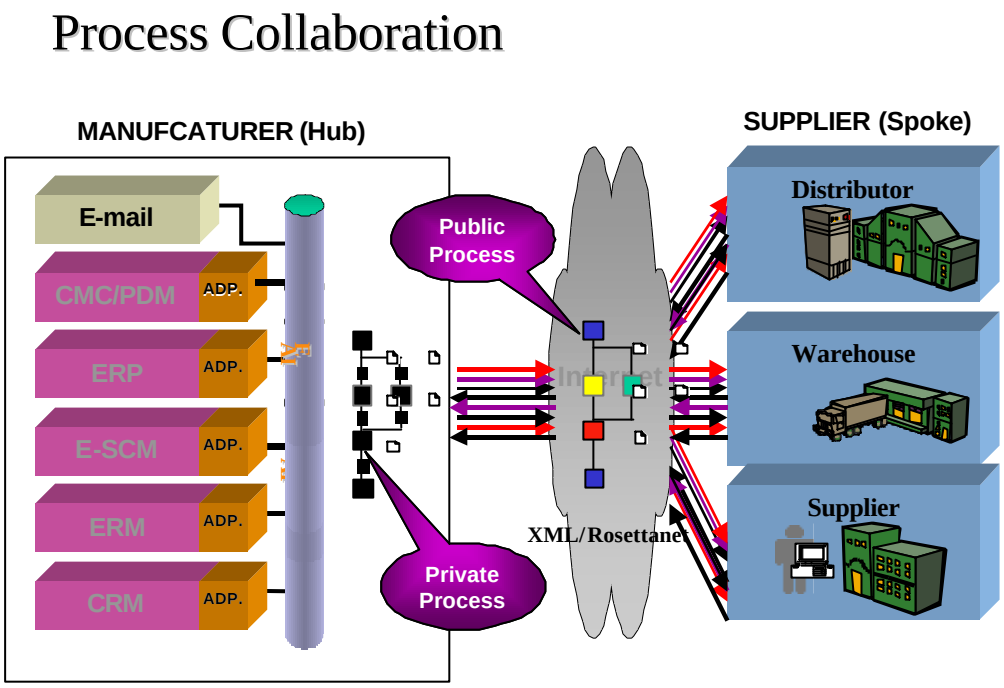


Chart <7>

There are three parts in “design & manufacturing collaboration.” They are: new product introduction, document consistency, and eRFQ. These three parts integrate the procedure consistancy in product development, consistancy in material use and consistancy in data recording and transmission. Any changes from demand side or supply side can be controlled and response if necessary. Please see Chart 8.

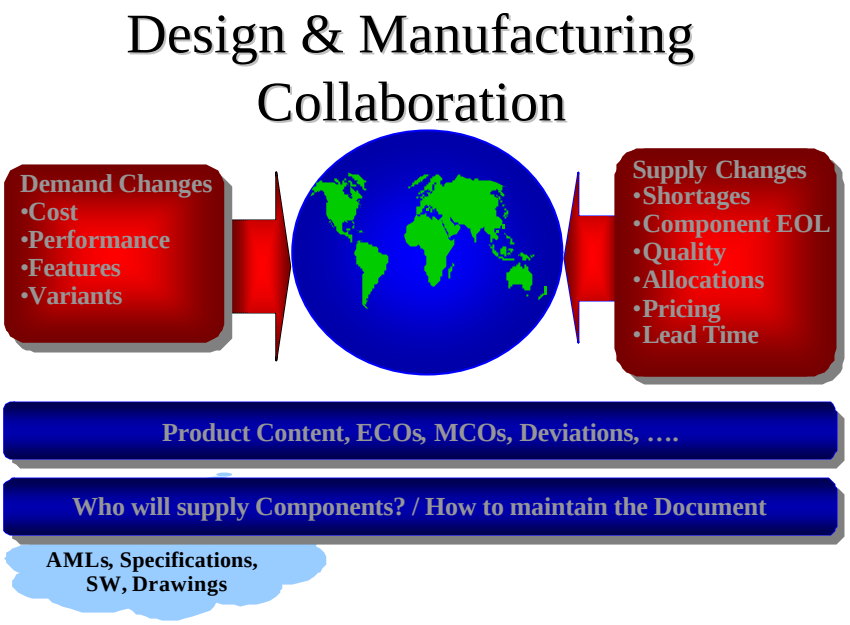


Chart <8>

Supply & demand collaboration integrates the production planning inside enterprises with market demand by adjusting production strategy, supply plans, material, and productivity according to market demands. It also allows companies to making proper recoveries and committments. See chart<9> for reference.

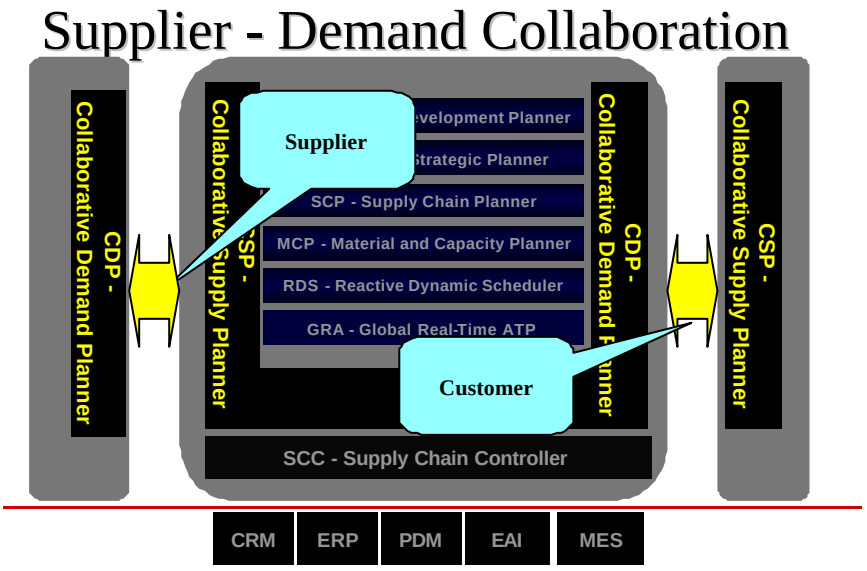


Chart <9>

eProcurement means using the Internet to deal with complicated up or down stream purchasing processes. In old times, MRP systems needed to issue out several orders, and every order communicated with the supplier several times. After suppliers received an order, they ran their own MRP systems, where the hundreds of orders suddenly appeared. These situations occured repeatedly. If the number of suppliers or customers grows, the situation becomes even more complicated. By using Internet, the purchaser sends out purchasing data based on their own producing situation. Thus, they can optimize their purchasing in terms of product amount, shipping date, shipping location based on demand. They can also control the product quality toward vendors.

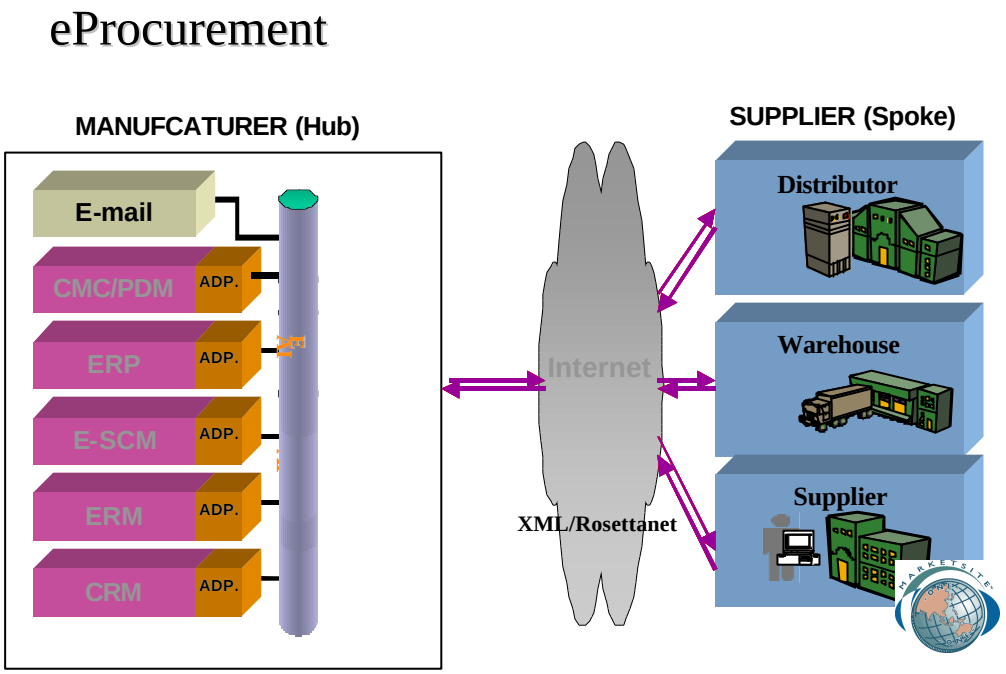


Chart <10>

4. SCM initiatives in Taiwan - Compaq TaiWeb project example

Background:

1. Compaq purchased NT$7 billion computer units in Taiwan on 1999, and achieved US$ 9.7 billion purchasing amount on 2000.
2. There are more than 40 Compaq direct vendors in Taiwan. The tier 2 vendors number is about 2500.

A-project makes Taiwan step into the E-commerce era

TaiWeb is closely connected to the Asia-Pacific High-Tech manufacturing center that we regard as one of the most essential policies. The government determined to positively promote the SC and DC work of E-commerce. The MOEA promoted the "A-project" in 2000 to construct a digital SC system. The participants are Compaq, IBM, HP and more

than twenty major domestic and foreign IT vendors. The annual purchasing amount of foreign participants has to achieve the goal of at least $1.5 billion.

The Supplier eBusiness Collaboration is the operating core of the A-project. The government expects to make the IT vendors integrate the upstream and downstream material, financial and information flow. This pushes the enterprises to level up the productivity, shorten the production cycle, lower inventory and save on operating costs. They also will construct the digital ordering and purchasing SC between foreign buyers and Taiwanese suppliers for bi-lateral benefit.

Compaq computer group pushes the TaiWeb project

The Taiwanese government thought that Taiwan's IT industry had suffered from the impact of globalization. In order to make the local industry competitive worldwide, Taiwan has to establish a global logistics center. In this regard, the goal of the TaiWeb project is to assist Taiwan's IT industry to become more competitive. With the effort of Compaq in terms of technology adoption and research, , Taiwan is presently two years ahead comparing to other Asian countries as far as the enterprises' digitalized global logistic center. This will be the future advantage for Taiwan, which is an IT manufacturing country.

The "Bullwhip-effect" for IT industry

The market situation affects the IT industry and traditional industries differently. Large amounts of collaborative manufacturers, i.e. the vendors, get involved in the computer producing process. Most of the time, there is not an obvious alarm when there is slight change in PC demand. However, demand and supply changes can hugely affect the PC supply chain to create an influence called the "Bullwhip-effect". The entire computer industry, including the motherboard manufacturers, chip semiconductor manufacturers, CPU manufacturers, case manufacturers, monitor, keyboard, and power supply manufacturers, and Windows series software vendors, all can suffer great losses when there is a huge supply chain change.

The advantage of SCM is to tell the demand and supply changes beforehand. Thus the information flow from upstream to downstream can be integrated and optimized, and the time-to-market can be greatly shortened.

One example of a supply chain's inability to respond in time is the "Tamagotchi" electronic pet once popular in Taiwan. The demand for the product vanished quickly, however, the supply was unable to receive the alarm signals. The down stream equipment vendors over expanded their productivity. The suppliers thus suffered a great loss because they were unable to receive knowledge of the latest market situation.

The goal and benefit of TaiWeb

1. Adopting SCM digitalized solutions to help the IT industry gain the advantage of more efficient operating procedures. The advantages are: lower inventory costs, higher inventory turnover, reduced operating costs, shorter order confirmation time, and better transaction rates.
2. Vendors' "new technology application" seminars would take place every quarter in order to educate Taiwanese IT manufacturers in SCM expertise, and allow them to

share experiences.

3. Achieve the goal of lower SC costs. As long as the project is finished and operating successfully, the purchasing cost could be lowered by 1%, or even 5%~10% per year in the future.
4. Integrating purchasing upstream and downstream, in order to help buyers predict market changes precisely and save unnecessary costs.

   The advantage of adopting SCM information systems is that if the market demand or equipment prices change, the upstream design could control the situation and respond in time. After changing the product set and handing it to the downstream manufacturing department to work on, the upstream suppliers respond to the market in time. For example, the traditional ready-made industry is ready to export female apparel to the American market. In the first season, the design transcript should be settled, thus the vendors can get orders from America. However, if the demand changes after design transcript is set, the American buyers might cancel the orders. When Taiwanese vendors receive the latest market situation, it is already too late. The products are already made, the manufacturers may have material in stock, and thus they must suffer from a great loss.

   The SCM information system expresses the latest market situation to the operating company and allows them to respond in time.

Summary

In a time when IT develops quickly, the application of technology becomes the strategy inflection point for enterprises. The key success factor is to use technology earlier than others and make technology the enterprise's core competence. After everyone has adopted the same technology, it becomes a key survival factor for the enterprise's survive. The Internet era is about competition between Supply Chain and Supply Chain not Manufacturer and Manufacturer. No matter SCM or global logistics, it is necessary to get rid of non-value added activities with technology and to integrate with procedures. In the era of Internet competition , in order to get compete advantage, enterprises have to follow these steps:

1.Respond quickly.
2.Extend procedures to partners.
3.Extend operating procedures.
4.Delete inefficient work through SC integration inside/outside enterprise.
5.Reconstruct the whole industry VC.
6.Re-estimate core competencies.

The global logistic collaboration mode is the ideal solution for enterprises.

Best practices in food industry in Thailand

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1) Introduction

The food sector is a major industry in Thailand, providing a large number of employments throughout the supply chain. Being the agricultural based country, the whole functions of supply chain can be clearly reflected on this type of industry. Farming and manufacturing are shown at the upstream side whereas distributing and marketing to both local and international channels are seen at the downstream side.

To cope with the challenges of having the whole chain in one country, the country cannot rely on isolated function. Coordination within and between elements is essential. The focus should be made on both upstream and downstream side of supply chain. However the current application of supply chain management in Thailand tends to emphasize on the coordination between industries or only the downstream side of the chain. Coordination between industries and retailers and markets is the first priority that everyone concerns. Despite of the importance of farming business in the country, coordination between farm produce suppliers and industries has not yet been given adequate focus. The upstream side to supplier and farmer should have gained higher attention. Upstream management in food supply chain should be comprehensively taken into account for more efficient supply chain.

Generally it is known that operation of a supply chain is a challenging and difficult task. Focusing on the upstream side, one of the typical difficulties in controlling the supply chain arises from the highly uncertain nature of raw material. Raw material availability is a major problem facing food industry. In this paper, we present the integration approach in supply chain which can help solve the raw material problem as well as smooth the operations.

2) Typical problems facing food supply chain and best practices of the integration approach

2.1. Upstream management - Coordinations with raw material suppliers

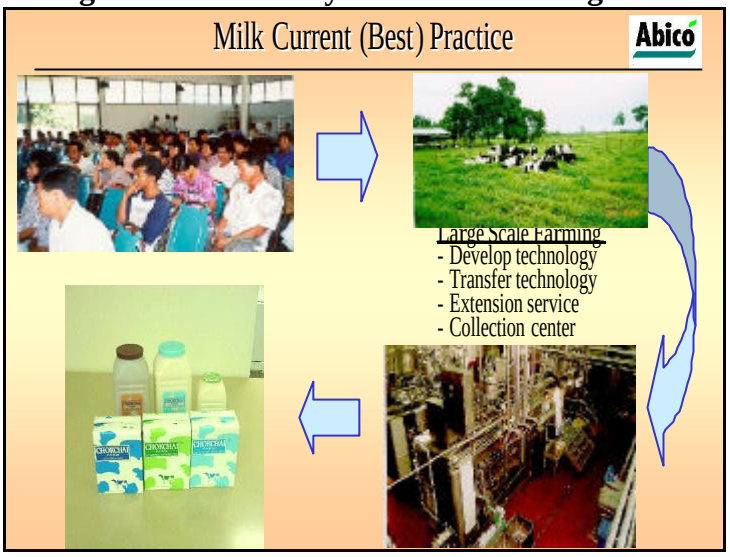
Mostly, raw materials for food industries in Thailand are supplied by farmers. Manufacturers buy the raw materail products directly from the farms. For instance, in canned pineapple and sweet corn industries, fresh pineapple fruit and corn ears are bought from the pineapple and corn farm respectively. Then they are delivered to the production plant for firstly grading, sizing and then to the production line. As mentioned earlier, raw material availability is a major problem facing food supply chain. This problem typically occurs in farming businesses especially where raw materials are available seasonally, i.e. pineapple fruit and corn in canned fruit and vegetable industries. The fluctuations in raw material availability causes the difficulty in the industry's capacity planning. All pineapple fruit and corn ears are normally bought into the processing plant as much as they are available. Although the amount of raw material influenced by seasonal factors cannot be controlled, the amount of raw material supplied by farmers can be predicted. Thus, coordination with the farmers is vital. At the current situation, the coordination in terms of contracting with the farmers is not yet possible since most farmers are still uneducated. The formal contracting cannot be applied. Yet, the informal contracting in the form of friendship contract is more applicable. Normally the manufacturer can observe the farm productivity through the personnel contract such as farm visiting time by time and inter-personnel chattering. The information gained informally here enables the manufacturer to predict raw material availability, harvesting period and farm productivity, and control the upstream supply chain more efficiently.

Figure 1: From Pineapple Farm to Processing Plant

Another interesting food industry showing best practice in upstream management is milk industry. Raw milk is also supplied from the milk farm. Before delivering these raw milk

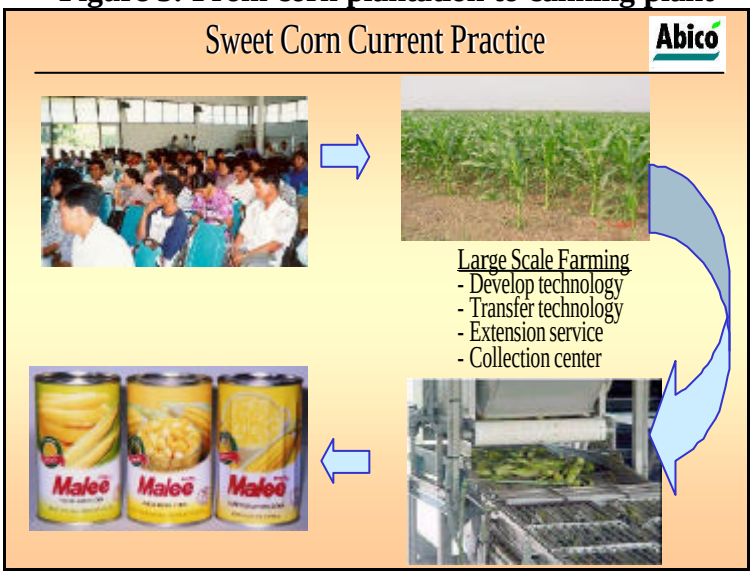
to the manufacturers, the raw milk needs to be pre-processed at the collection center at the farm. At this collection center, the raw milk is checked and only the qualified quality standard milk is delivered to the manufacturers. With this practice at the collection center, the manufacturer is able to collect and grade the good/bad raw materials at the farm without paying the delivery cost for the defecting raw materials to the plant.

Figure 2: From dairy farm to Processing Plant



This practice is recently adopted by other industries namely pineapple and sweet corns in these industries, only 70% of all raw materials delivered to the manufacturer are in good quality, 30% are defect. In spite of spending 30% of delivery cost for these defects, having adopted the practice of milk collection center, the manufacturer can also setup the collection center nearby the partnership farms. Collecting, grading and sizing only good raw material can take place in this collection center. As a result, the manufacturer can save the raw material delivery cost. The defecting raw materials can be discarded from the delivery.

Figure 3: From corn plantation to canning plant



2.2. Best Practices of the integration approach

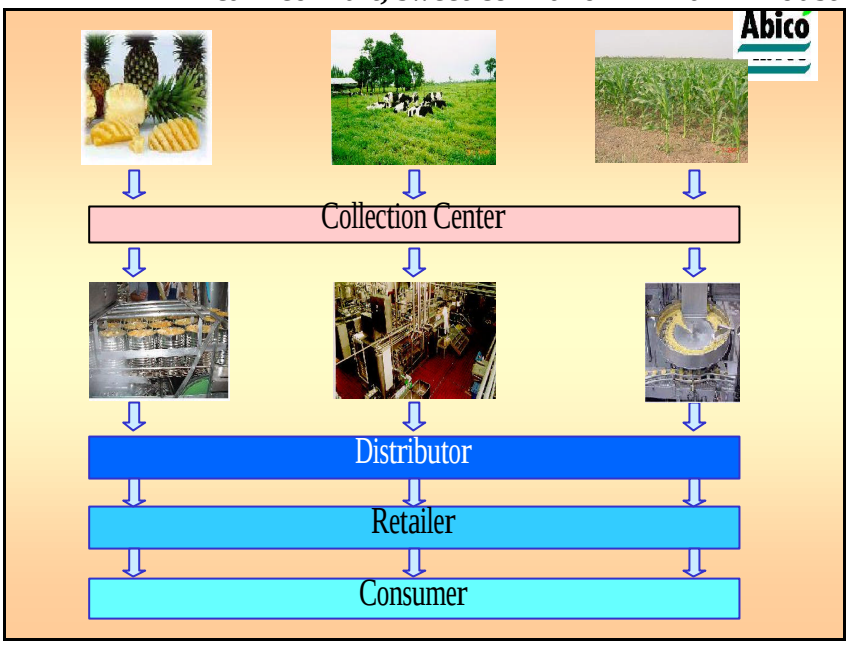
The ongoing competitiveness of an organization is linked with the dynamics of the supply chain(s) in which it participates, and recognition of this fact is leading to considerable change in the way organizations interact with their supply chain partners. The interaction among the elements of supply chain can be captured by studying the coordination structure of the supply chain. In food industry in Thailand, the interaction among the supply chain elements are obviously show horizontally and vertically.

The horizontal supply chain shows the link between business partners. The coordination among different types of food industries is evident. The industries where its waste or by-product can be a resource or raw material for other industries are corporated. This can be obviously seen in fruit, vegetable and dairy product industries. Waste from canned pineapple and corn industries, such as pineapple skin or corn husks, can be fed to dairy farming industry. In turn, waste from dairy can be used to fertilize the pineapple and corn farms. Defected corn ears can be made to corn milk and packed by the facilities sharing with the pineapple juice manufacturing. Furthermore both canned pineapple and corn manufacturers can be supplied by the same can making industry. High consuming volume can reduce the cost of empty can as well as the ordering cost. Downstream to the market, these products- fruit juice, milk and corn milk- can be sold together to the same market and gain the marketing power.

On the other hand, the vertical supply chain is the link between farmers, manufacturers, distributors and markets. The relationship with farmers has been introduced previously. However, in food industry, the horizontal integration also supports the vertical integration at the farmer side. Since the similar types of industries are coordinated – canned pineapple, sweet corn and milk, the farmers are encouraged to farm all these types of the input raw materials. Instead of farming only short life crops like corn, the farmers can add seasonal fruit like pineapple which can be harvested seasonally in the farm. Furthermore, they can also do the milk farm and collect the raw milk all years round. They can then sell all of their products to the same group of industries and ensure the amount of products sold. There is no need to find the market channels at every harvesting season. In turn, this group of industries can minimize the risk of raw material shortage. The amount of raw material can be guaranteed for production each time. Both parties – farmer and manufacturer – can then benefit from this coordination. On the other hand, downstream to the market, working together between manufacturer and retailers is vital. Marketing program must be agreed upon together. Good coordination must be on the conditions of on time delivery, competitive price with better service.

Examples of the horizontal and vertical supply chain integration in canned fruit, sweet corn and milk farm industry are illustrated in Figure 4 below.

Figure 4: The horizontal and vertical supply chain integration in canned fruit, sweet corn and milk farm industry



3) The Practices implementation

3.1. Key success factors

Even though, the integration approach illustrated in the previous section has led to the mutual benefits sharing between parties, a number of success factors also need to be taken as a basis. Firstly, within this great deal of coordination, at the strategic level, cost must be one of the performances controlling overall operations in this food chain. Low cost is still needed everywhere in the chain. Secondly, high level of service is still a key strategic performance that one in the chain must bear in mind. Furthermore another issue that has drawn much attention currently is the driving force from customers. Ability to respond to consumer behaviors has been recognised by all functions in food supply chain. Customization has become a key driver in managing and controlling the chain.

At the managerial level, information and data are very important in this food chain. Past data must be recorded. Consuming demand in the past is one of the essential data which controls the management details in the future including volume, price and demand behaviour of each produce type.

3.2. The Practices implementation in Small and Medium Enterprises (SMEs)

The success story, created by the concept of coordination and integration, shows a number of benefits in this food chain. Applying this concept to SME might upgrade the SME management and bring them the efficient outcomes from supply chain. Nevertheless, the SME environmental factors should also be considered. One of the obstacles is the readiness of SME in implementing this coordination and integration concept. They still lack the understanding on the concepts. Most staffs are not yet qualified. Training on the concepts is still required for most functions in SME e.g.

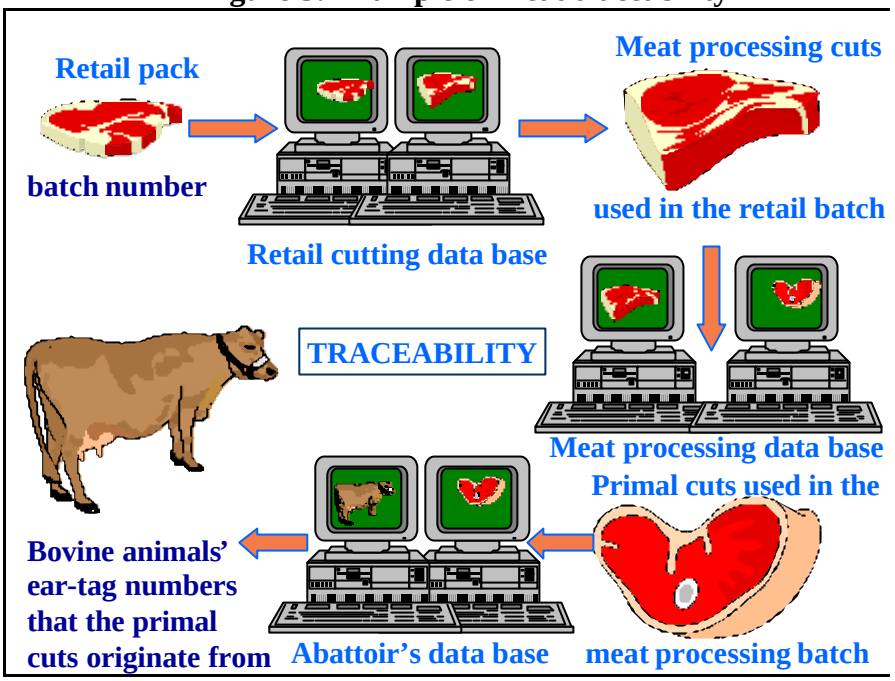
accountancy, finance, operation and management. Apart from that, inadequate infrastructure in both physical elements and enabling technologies for facilitating the concepts is apparent in SME. This is not yet to mention their understanding in utilizing the facilities. The application tends not to be possible to develop in house by SME. A current recommendation for improving SME performance must be an establishment of a service infrastructure center. This center should provide the SMEs the training and implementation of the concepts. Moreover, in achieving this concept, groups of SMEs should be able to share the same facilities and infrastructure provided by the center.

4) Discussion and Conclusion

Being an agricultural based country, the country is able to control the whole loop of the food chain. From upstream to supplier toward downstream to customer, raw material availability tends to be a key driver forcing the material flow in the chain. Farmers tend to be a key element. Alliance between farmer suppliers and manufacturers seems to be a significant factor in controlling a smooth operation. Noticeably, informal alliance is normally formed between both parties. The limitations are still on the farmers' educational level and the infrastructure availability.

On the other hand, the supply chain concept tends to give much concentration on the downstream side to the market and customer. Although this side of the chain plays a major role in feeding the input information controlling the operation in the chain, the focus should be slightly changed due to the current global direction. This refers to the consumer behaviors. Customization nowadays has come into play. It influences the whole chain's activities. Ability to respond to this change must be addressed in the chain. Furthermore pressures also come from the exporting markets. Latest news on July 16, 2001 (Bangkok Post – Business) reports that the Food law and Biotic unit of the European Commission's Health and Consumer Protection has urged the food exporters to concern about current food safety. This requires extensive labeling of food, including genetically modified products. The origin of all food ingredients, the food supply chain from primary production to sale to the consumer must be traceable. Food business operators are required to provide information to the public of at least from whom food or ingredients been obtained and to whom these may have been supplied.

Figure 5: Example of meat traceability



From this health and safety concern, the upstream side of supply chain must also be highlighted. Safety and traceability issues have driven the trend to focus more on the upstream side of the chain. It must be noted that the information fed into the chain should not only come from the market side, the other side of the chain must also be taken into account. In the food chain, if farmer suppliers can be involved in the information cycle flow, the benefits gained could be as much as the efficient use of information in the market side. The strategy used with the market side should also be considered and applied to the farmer supplier's side. Ultimately, food supply chain excellence could then be obtained. Another perspective on this new trend – food safety and traceability requirement- shows that instead of taking this new emerging issue as a new difficult task, industries and businesses could look at this trend as an opportunity. It enables the industries and businesses to see the marketing trend and urges them to be aware of the development of the markets. Achieving this new task means that the businesses could survive or even be a leader in this new marketing channel.

Best Practices in the Textile & Garment Industry

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Abstract
Effective supply chain management requires integration of business processes and efficient information exchanges between trading partners. Traditional Electronic Data Interchange (EDI) has been the means of business-to-business (B2B) electronic communication between trading partners in the apparel supply chain. But different EDI standards within the industry lead to complexity and high investment for implementation by Asian manufacturers, particularly Small and Medium Enterprises (SMEs), who generally lack the EDI knowledge and information technology implementation capability. Added to this difficult situation, there is no simple, affordable and interoperable software in the market. To resolve the situation, a common industry-wide global standard is essential to serve as the communication backbone.

Realising the situation, global industry bodies including the Global Commerce Initiative (GCI) (a user forum of multinational retailers and manufacturers) together with EAN International (EAN) and the Uniform Code Council (UCC), (which are the joint owners and operators of the internationally renowned EAN•UCC system of supply chain standards) worked together in May 2000 to facilitate the development and adoption of global electronic communication standards for the apparel industry under the auspices of GCI Global Apparel Supply Chain Initiative led by leading global apparels retailers and manufacturers such as Federated Department Stores, Esquel, Target/AMC, Marks & Spencer, Home Depot and GAP.

This EAN•UCC standard has been developed based on the eXtensible Markup Language (XML) language and endorsed by GCI called 'Global Commerce Internet Protocol' (GCIP). XML is a new technology for internet-based communication. The XML standard for apparel supply chain consists of the core GCIP and its extension for apparel industry. This standard is compatible with current EDI messages and can further be developed to integrate business processes of raw material/semi-finished goods suppliers as well as with logistics, customs and finance.

The GCI Global Apparel Supply Chain Initiative conducted a global pilot in May 2001 between Target/AMC (Target, a leading US retailer and AMC, its sourcing organization) and Esquel (a leading Hong Kong manufacturer) to validate the electronic business model

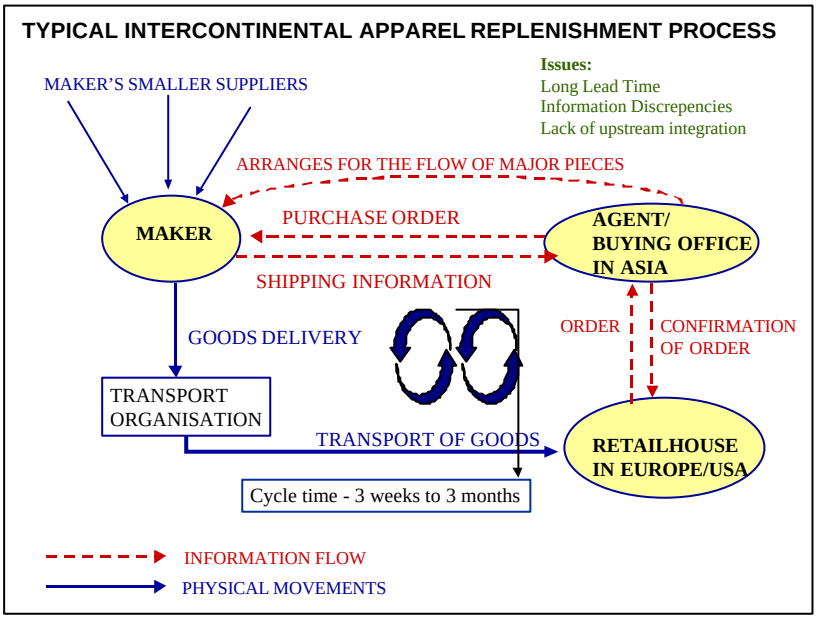
for apparel industry and the future direction of B2B electronic communication. It also evaluates the compatibility with existing EDI communication and the potential to assist SMEs in effective implementation of electronic communication in the supply chain.

Keywords: Supply Chain Management, Global Standards, Electronic Commerce, XML Technology

1. Apparel Supply Chain Challenges

Rapid technological developments and trade liberalisation has had a tremendous impact on the apparel industry. Fashion creation and design centres located in North America and Europe, Asian mills that supply textiles coupled with manufacturing operations located thousands of miles away from the centres where these products are sold, have created global supply chains that are transverse all continents.

Raw material costs are rising, competition from countries with cheap labor is increasing. Consumers want higher quality and lower prices and demand for products shift rapidly. Retailers have been challenged by new retail formats, which have managed to break away from traditional buying procedures, moving product development and buying decisions closer to the consumer's place of purchase. While inventory turns of two to four times per year are still very common, "best practice" retailers achieve more than 10 inventory turns, with a strong positive impact on their financial performance.



To meet these challenges, many retailers are re-engineering their supply chain processes to ensure quick, accurate and efficient product sourcing and services delivery. This in turn means garment and textile suppliers must adapt themselves in order to maintain their competitive edge in the global market.

Companies all over the world are realizing that effective and efficient control of the supply chain is the way for success and survival, and adopting globally recognized supply chain management best practices and e-commerce technologies is the absolute key.

2. Supply Chain Essentials – Electronic Communication

2.1 Challenges in Electronic Communication

Effective supply chain management requires integration of business processes and efficient information exchanges between trading partners. Communication technologies such as telephone, fax and email have greatly speeded up procurement and distribution processes. However, all of these technologies require manual interpretation, thus inducing human errors and repetitive manual handling of information. In this Information Technology era, effective electronic communication is one of the very important best practices in supply chain management.

Traditional Electronic Data Interchange (EDI) has been the means of business-to-business (B2B) electronic communication between trading partners in the apparel supply chain. However, different EDI standards within the industry have led to complexity and high investment for implementation by Asian manufacturers, particularly SMEs, who generally lack the EDI knowledge and information technology implementation capability. Added to this difficult situation, there is no simple, affordable and interoperable software in the market. To resolve the situation, a common industry-wide global standard is essential to serve as the communication backbone.

2.2 Importance of Open Standards

Open standards benefit all users. They bring the stability and technical backbone necessary for truly seamless, borderless trade and commerce.

In view of the rapid development of electronic commerce at both regional and international level, there is an urgent need to adopt global open standards in electronic communication for data exchanges and electronic document transactions.

Structured data format for B2B electronic transactions eliminates the additional effort required in data re-entry and mapping. The rapid emergence of the internet as a key communication channel has also highlighted the need to develop global communication standards that allow automated data exchange within EDI environment and internet-based applications.

In fact, there are already some worldwide initiatives in place championing the development of global standards for the apparel supply chain.

3. Worldwide Initiatives on Electronic Communication

3.1 Global Commerce Initiative

The Global Commerce Initiative (GCI) is a global supply chain initiative for the consumer goods industry with the mission to better meet the needs and expectations of consumers around the world by ensuring availability of consistent voluntary global standards. The idea is to build a collaborative inter-business process that will endorse a recommended set of standards, enabling technologies and best practices with worldwide applications, which will provide benefits to all users, large and small, wherever they operate.

The GCI is a global user forum formed in 1999 comprising senior executives of multinational retailers and manufacturers of consumer goods industry located on different continents such as Kraft, Federated Department Stores, Target Corporation, Marks & Spencer, Unilever, Procter & Gamble, Ahold, Home Depot, Tesco, Johnson & Johnson, Philips, Wal*Mart, etc.

The Initiative seeks to smooth out international variations in supply chain standards. While much progress has been made locally within Europe, the United States and parts of Asia, there remain substantial process barriers between continents.

3.2 Global Apparel Supply Chain Initiative

While the initial focus of GCI was on fast moving grocery products, the user forum also saw the need of global supply chain standard to cover imports and exports particularly apparels. In 2000, the GCI Global Apparel Supply Chain Initiative began.

The nature of the apparel industry is different from that of the grocery industry in terms of product nature and order lead-time. When comparing the business processes of these two industries, it was found that the operation of grocery industry is based on 'make-to-stock' process (i.e. goods are made by suppliers and stored as stocks by suppliers for order and delivery request by their retail customers). But for apparel industry, the process is 'make-to-order' (i.e. goods are made by suppliers at the specifications of their retail customers.)

3.3 EAN·UCC Global Supply Chain Standards

The EAN•UCC System is a set of international supply chain standards, jointly developed and managed by EAN International and the Uniform Code Council (UCC). EAN International and the UCC have taken a leading role in establishing global standards for supply chain management and key business processes. EAN International comprises 96 Member Organizations throughout the world representing 126 countries/economies and the Uniform Code Council representing the interests of member companies in the United States and Canada.

The EAN•UCC System provides a set of global supply chain standards which identify the physical flow of goods and the corresponding electronic flow of information related to the product. These open, global standards enable efficient management of all aspects of

the transactions surrounding the product throughout the supply chain. The EAN•UCC System includes the specification, standards, and guidelines for eCommerce to enable companies of any size, industry, or geography to communicate in the Global Language of Business. Today, nearly 900,000 member companies in 128 countries/economies use the tools and standards of the EAN•UCC System for their daily business communications, representing over 5 billion scanning transactions a day.

In support of GCI Global Apparel Supply Chain Initiative, EAN International merged its DressCode project (a Hong Kong-led project on development of global apparel supply chain standards) with GCI to form a truly global apparel supply chain initiative. This collaborative effort is focused on the development and adoption of a global electronic communication standard for the apparel industry.

4. GCI Global Apparel Supply Chain Initiative

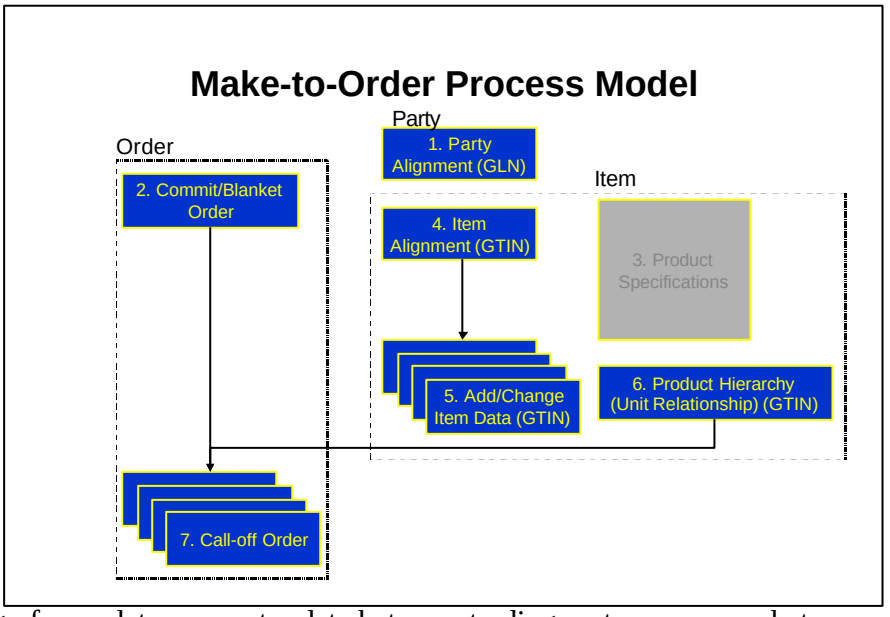
The GCI Global Apparel Supply Chain Initiative was launched with the mission to promote and endorse global business-to-business (B2B) electronic communication and technology standards, which compliment and drive efficiencies in the apparel supply chain.

This initiative is included in the work programme of GCI Imports/Exports Sub-Committee co-chaired by the Federated Department Stores in the USA and the Esquel Group in Hong Kong. Other members include EAN•UCC, Target/AMC, Home Depot, Marks & Spencer and GAP. While EAN•UCC is responsible for the standard development, the industry users are the key drivers in providing users' input throughout the standard development process.

4.1 How are the global electronic communication standards for apparel industry developed?

Development of all supply chain standard starts with the business process. To develop the standard for B2B electronic communication, a business process model called 'Simple e-Business Process Model' was recommended. It is the best practice supply chain business model endorsed by GCI.

The concept of 'Simple e-Business Process Model' is to harmonize core information between trading partners, prior to conducting transaction since many of the core information are commonly referred to in all transactions. For example, in ordering and invoicing transactions, core information like item number, description, buyer and seller are repeatedly used.



Sharing of core data, or master data between trading partners or even between exchanges is crucial for effective B2B data exchange because it forms the basis of business systems and the reliability of the flow of goods along the supply chain depends on the quality of the information. Such data sharing is commonly known as Master Data Alignment or Master

Data Synchronization.

The use of internet technology offers a unique opportunity to simplify business processes and facilitates the implementation of 'Simple e-Business Process Model' and XML is the technology for internet-based communication. An XML standard was then developed by EAN•UCC in collaboration with GCI for the global consumer goods industry called Global Commerce Internet Protocol (GCIP).

The GCIP was originally developed for the make-to-stock business process of consumer goods industry. To accommodate the nature of apparel industry, it is further developed under the framework of 'make-to-order' business processes in the form of apparel industry extensions. Thus the XML standard for apparel supply chain consists of the core GCIP and its extension for apparel industry. This standard is compatible with current EDI messages and can further be developed to integrate business processes of raw material/semi-finished goods suppliers as well as with logistics service providers, customs and financial service providers.

Although the GCI Apparel Supply Chain Initiative is primarily driven by a group of leading multinational companies, its objective is, however, encompassing the entire industry, including big & small companies, as well as the potential to align with other consumer goods supply chain. Ultimately the standards need to:

a) work on the internet
b) be easy enough for SMEs to implement
c) be able to align with other consumer goods supply chains
d) be able to integrate with processes of other supply chain parties such as raw material/semi-finished goods suppliers, logistics service providers, customs and financial service providers
e) be compatible with current EDI messages to accommodate the needs of existing users

Based on the above objectives, a global pilot between Target/AMC (AMC on behalf of Target Corporation, a leading US retailer and its sourcing organization – AMC) and Esquel (a leading Hong Kong manufacturer) has been conducted.

5. Global Make-to-order Apparel Pilot

5.1 Pilot Objectives

This pilot was initiated in May 2001 – the first global pilot using make-to-order business model and apparel XML standard. It is a trial to test out that the model and standard would

a) work on the internet
b) be easy enough for SMEs to implement
c) be able to align with other consumer goods supply chains
d) be able to integrate with processes of other supply chain parties such as raw material/semi-finished goods suppliers, logistics service providers, customs and financial service providers
e) be translated from EDI to XML in the current pilot for implementation with legacy systems to accommodate the needs of existing users

5.2 Scenario of the Global Pilot

To simulate an electronic business transaction in apparel XML standard across continents, a pair of trading partners locating in two different countries was selected. They were Target/AMC (a leading US retailer) and Esquel (a leading Hong Kong manufacturer).

The pilot is conducted in several phases. At the first phase of this pilot, some documents were selected for transaction. They were item master (product of agreement between retailer and supplier); party master (information describing buyer or seller eg. name, address, terms of agreement); blanket order (initial commitment made by retailer for total program buy) and call-off purchase orders (detailed purchase order with exact quantity for specified delivery date and location. These documents were sent by AMC as EDI flat files, which were received and converted by Esquel in apparel XML standards.

5.3 Why do the pilot companies participate in this pilot?

Both AMC and Target Corporation have always been on the leading edge of technology, unfortunately not until the emergence of the internet has there been such a great opportunity to embrace technology as a means to communicate on a global scale with all types of business partners, both big and small.

Target Corporation is a leading retailer in the United States. It has its wide range of products sourced in 54 countries via its subsidiary AMC, the second largest global sourcing organization. Target would like to utilize supply chain management to satisfy their customers who were demanding high-quality products at the best prices and up-to-date fashion designs. The ultimate objective is to enhance their global competitiveness. But one of the key issues is to communicate with its suppliers easily and efficiently.

Target has been communicating electronically with its worldwide business partners through AMC by means of EDI. While EDI has proven itself to be a powerful means of communication, it definitely proved not to be the sole answer to advancement. It was missing the base to enable the deployment at all levels. A much stronger stand on global

standards is needed. Standards were developed to ease communication, the intention was good but reality showed that much customization was done to allow each individual retailer to ensure that both internal systems and processes would be secure, and would not require adapting new rules.

However, difficulties were encountered when it rolled out electronic document exchanges with its suppliers. Many of its apparel suppliers are located in Asia. These suppliers are of different capability in electronic communication. Indeed some of them even have no capability at all. For those who have experience in electronic communication with their customers, different standards are being used. For Target/AMC, it is using VICS/ANSI for EDI transaction. But their suppliers in Asia are using another standard, EANCOM®/EDIFACT. Even using VICS/ANSI as EDI standard for transaction, different customizations and the liberal use of EDI standards make both retailers and suppliers, in particular SMEs, difficult to cope with. AMC as an example has 40 EDI partners, 29 customized EDI transactions, 11 standard EDI transactions, and 4 types of EDI standards.

While understanding their suppliers need to take time to embrace EDI technology, Target/AMC think that it is essential to have a worldwide common standard for electronic communication to help their implementation. For SMEs, also the suppliers of Target, EDI may not be the best choice for them. To enable their participation in B2B electronic communication, the emergence of the internet and XML technology is definitely a good opportunity. Being on the leading edge of technology and with the belief of eliminating communication barriers for better focus on serving customers with right products, Target/AMC is committed to work on this initiative.

Esquel Group is an international apparel manufacturer based in Hong Kong that provides quality cotton garments to customers all over the world. Esquel has a unique vertical strategy where it owns and controls the supply chain from cotton farming, weaving, spinning, textile, accessories and eventual garment production. Efficient information transfer and integration has always been a key ingredient in Esquel's ability to efficiently control the supply chain in order to ensure quick response and efficient inventory management. Some of Esquel's customers also believe in the value of efficient information transfer and have adopted EDI very early.

EDI adoption has been a very positive initiative that has many benefits to OEMs such as Esquel. EDI reduces errors in information transfer from Purchase Order to Advance Shipping Notice. It speeds up communication and assists in reducing cycle time and results in costs saving due to reduction of manual input. However, EDI is costly to set up and more importantly the different EDI standards of different customers result in high maintenance costs. Within Esquel, there is a need for 4 full time IT member and other part time staff to maintain its EDI capability for only 5 to 6 customers. Secondly, it is difficult to integrate EDI transactions into Esquel's enterprise information systems. Furthermore, the costs and difficulty of EDI implementation have prevented Esquel's other customers from adopting this technology. With a common standard used by all customers and suppliers, Esquel believes the B2B electronic communication will be made easier and less costly.

The two companies saw the need for a common industry-wide B2B electronic

communication standard that allows integration with all supply chain parties to serve as the backbone of communication. When the GCI Global Apparel Supply Chain Initiative was launched, both companies were very supportive and showed great interest in participation of a global pilot.

5.4 Pilot Experience

The pilot has made a good start for the GCI Global Apparel Supply Chain Initiative.

At this early stage of the pilot, it was found that EDI and XML are interoperable in the data exchange between the pilot companies. The two technologies can co-exist without jeopardizing the transactions between trading partners. The 'Simple e-Business Process Model' can be applied to 'make-to-order' processes in apparel industry in real-life transactions. The concept of master data alignment works in the apparel make-to-order business process. It helps eliminate the sending of repetitive data in document transactions and simplify ordering process.

Generally speaking, apparel XML standard implementation requires moderate investment, as compared to conventional EDI. It requires less development, maintenance and software cost. XML technology is less costly and is complementary to conventional EDI. It provides a new avenue for SMEs to equip with electronic communication capability.

6. Benefits to both retailers and suppliers, big and small

All parties in the apparel supply chain are beneficiaries of global standard adoption.

With one global standard across the apparel supply chain, retailers enjoy faster rollout of their supply chain program to all of their suppliers which enable them to cope with increasingly competitive retail markets. Shorter lead-time, lower operating cost, the transparency of information as well as elimination of language barriers are just a few of the benefits that retailers could realize.

On the supplier side, no matter the company is big or small, for the first time, it no longer needs to cater multiple requirements from different customers. With one standard interface, suppliers can communicate with different customers in a standard electronic format, minimizing investments while providing value added services to their customers and improving their own operational efficiency.

SMEs, who generally lack the EDI knowledge and capability of information technology implementation, would mostly benefit in the adoption of a global standard. When software has been fully developed to embrace these standards, it will be easier and more affordable for SMEs to conduct electronic transaction with their customers as the software will be made to be interoperable based on common global standards.

The apparel XML standard is applicable to large companies, which prefer direct integration of electronic messages with their in-house computer systems. It is also a flexible tool for SMEs, where XML applications can be viewed with simple browser interface. It can greatly reduce the technical implementation effort and investment required for SMEs.

In summary, adoption of global standards will bring definite advantages to all parties in the apparel supply chain. It will lead to

- A more responsive, flexible and predictable global supply chain through a better system of information communication, product and shipment identification, tracking and tracing.
- And through the support of an open system, which is cheaper and more efficient to deploy, companies enjoy quicker return of investment and ease of global adoption.
- And most importantly, adoption of a global standard enables a more competitive supply chain, which makes it possible for the apparel businesses to have continuous growth in the competitive marketplace

7. Future Vision of B2B Electronic Communication

Communication between trading partners has evolved considerably since the generation of paper documents using telephone and fax machine alone. Today there is a new generation of electronic communication by the ability to transmit electronic documents over the internet. Electronic communication offers reduced costs and greater efficiencies for business organizations. While there are obstacles, it is clear that the success stories of the new economy will increasingly feature organizations that take advantage of the latest technologies and use them to enhance their own competitive advantage.

Adopting global standards and reliable technologies is the key to successful implementation of electronic commerce. While XML is an evolving technology which promises for more cost-effective means to communicate electronically (in particular for SMEs), EDI will still be in existence and complementary to the XML technology. Yet seamless worldwide information flow will not be achieved without a good infrastructure. A compatible global standard is surely the backbone of electronic commerce in the worldwide business community.

The global pilot is helping to demonstrate the benefits of the adoption of global standards in the apparel supply chain. The pilot is only the beginning of the global apparel supply chain standardization process. There is still a long way to go. Some of the actions the group has foreseen to take are:

- To invite participation and support on this initiative from more retailers and manufacturers around the world
- To promote the initiative to a wider group of audiences, especially SMEs in Asia
- To work with 3rd party solution providers and application service providers to embed the standard into their solutions so that SMEs could implement the standard in a more cost effective manner
- To work on more business processes, such as the delivery note, product specification, invoice and request for quotation (RFQ), etc.

GCI and EAN•UCC are committed to working closely with the user community to jointly facilitate the development and implementation of global supply chain standards in the apparel industry, with the objective of elevating the apparel supply chain to a higher level of efficiency.

Strategic Alliances in Supply Chain Benchmarking for SMEs

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Abstract
To continuingly improve performance to meet the ever growing expectation of the customers, small and medium size enterprises (SMEs) need to look beyond their own company and in-fact at the total supply chain in order to understand how to best serve the demand of the final customer**.** Under this new economy, it is even more important for SMEs to adopt a on-going corporate benchmarking philosophy in order to create an attitude of continual operations improvement. However, most SMEs cannot do this on their own. Supply Chain Consortium Benchmarking is a methodology applied by the Asian Benchmarking Clearinghouse (ABC) which can help the benchmarking participants to reduce their time and effort in benchmarking with others, both within the consortium and outside the consortium while observing real life examples of best practices of the best practice partners. This paper will provide the readers on details of consortium benchmarking and how support center can help in this benchmarking process.

Keywords
Supply Chain, Benchmarking, Consortium Benchmarking, SMEs, Best Practice Partners

1.0 Introduction

In today's rapidly changing business environment, ever-greater demands are being placed on business to provide products and services quicker with greater added value. Customers want more quality, design, innovation, choice, convenience and service. They want to spend less money, effort, time and risk for more. Companies realized that the capability of providing and delivering goods and services with much shorter cycle time and at lower cost in achieving customer satisfaction and success is the key to sustainable growth and even survival. To continuingly improve performance to meet the ever growing expectation of the customers, one needs to look beyond its own company and in-fact at the total supply chain in order to understand how to best serve the demand or the final customer.

The word "supply chain" refers to the alignment of exchanges and business processes of firms that bring products or services to the market. Managing these processes has now emerged as the core operating and marketing strategy to meet the of service demand of customers and end-customers to achieve lower overall cost. Effective material, information, financial and collaborative planning flows are all part of this integrated supply chain management. Prof. Douglas M. Lambert (1998) describes supply chain

management as the "integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders." In supply chain management, achieving these rather complex business processes across multiple firms from end users through original suppliers is not an easy task even with the leading companies. It requires a keen understanding of the supply chain and more importantly a "mind-set" geared towards providing a better value chain. This "best practice benchmarking" mind-set is characterized by leading companies reflected in their continuous desire to seek superior supply chain performance,/competency and competitive advantage through benchmarking. These leading companies are very much aware that benchmarking is the process by which they can discover "best practices."

David Riggs (1998) defines best practices as the way leading business operations implement work processes well. In their continuous improvement effort, they apply benchmarking, and look at other companies inside and outside their industry to find better ways to improve service, productivity and manage costs.

Small and medium size enterprises (SMEs), are also under constant pressures to improve performance. Under this supply chain and new economy, it is even more important for SME to adopting a corporate benchmarking philosophy so as to create an attitude of continual logistics operations improvement. Some firms uses a "scorecard" and emphasizes benchmarking of metrics in an effort to develop comparison standards. Others seek to improve logistical competency and competitive advantage through competitive benchmarking. Both metrics and processes are key components of world-class performance measurement.

2.0 Benchmarking Defined

Benchmarking is defined as a systematic procedure for identifying the best practice and modifying actual knowledge to achieve superior performance. While benchmarking is not the only explanation for the success of all the leading companies, the continual search for better practices to drive improved performance is a major contributor.

Supply chain benchmarking is also a critical aspect of the comprehensive performance measurement. More and more firms have adopted supply chain focus benchmarking as a technique to compare their total supply chain operations to those of both competitors, leading firms, related and non-related industries. Suppliers, manufacturers, third party logistics providers, and retailers in particular are using supply chain benchmarking methodologies to calibrate total logistics operations as a strategic networking competency measure to improve joint collaborative planning, forecasting, and replenishment focusing on delivering higher service satisfaction at lower overall cost.

Supply chain benchmarking is supported by three basic beliefs. Firstly, progressive firms must seek to continuously improve all facets of their operations to achieve effective end customer fulfillment competencies. Therefore, their attitude should be one of fixing or improving internal work methods and practices. Secondly, end-customer fulfillment operations efficiency must be looked at in terms of reducing time, cost and activity across the supply chain. This external process integration can be achieved among other factors

through strategic alliances and collaborative partnership. Lastly, best practices should be identified and studied, which typically means searching outside one's own enterprise. This means a commitment to seek and identify best overall supply chain practice wherever it may be.

3.0 Types of Benchmarking

Since actual benchmarking initiative typically covers a broad range of activities, from benchmarking within the organization, to competitive benchmarking, and perhaps all the way to an unrestricted comparison in seemingly unrelated industries in order to discover best practices.

Internal benchmarking focuses on performance measures of comparing activities and processes to previous operations and/or goals. For example, customer service might be compared to last period's actual performance as well s to this period's goal. There are six key areas of internal logistics benchmark assessment. These are (1) cost, (2) customer service, (3) productivity, (4) asset management, (5) quality, and (6) fulfillment operations cycle time (speed).

External benchmarking performance measures are also necessary to monitor, understand, and maintain a focused customer perspective and to gain innovative insights from other industries. An important component of external benchmarking is the regular measurement of customer perceptions. Such measures can be obtained through surveys or by systematic follow-ups. The typical survey incorporates measurements of customer perceptions regarding availability, performance cycle time, information availability, problem resolution, and product support.

Competitive benchmarking is one of the measurements that has attracted a lot of interest. It revolves around the desire to compare logistical performance with competitors. This desire is a natural result of the drive in business to gain competitive advantage. However, competitive benchmarking can, at best, be used by logistics executives to identify where improvement is most needed.

Non-restricted benchmarking is another focus concerning the best practice comparison of both metric and process, regardless of where the relevant practice is found. It is not restricted to internal operations nor to a specific industry. Search for best practices can and often does extend to unrelated industries or organizations.

In the following section, I would like to introduce Supply Chain Management Benchmarking Consortium Studies. This consortium benchmarking methodology is one of the premier methods for successful benchmarking. It is a powerful tool for identifying best and innovative practices and for facilitating the actual transfer of these practices. The consortium consists of best practice partners and sponsoring participants in the study. A four-phase approach which consists of the planning phase, the data collection phase, the analysis phase, and the reporting and adoption phase. The study includes site visit observations, interviews and knowledge transfer sessions. Although the requirements of a particular function may not be exactly the same in non-competing companies, organizations using non-competitive consortium benchmarking are discovering that they

are able to identify ways to improve their systems, practices, and methods for most business functions, especially those involving supply chain logistics. In fact, the consortium benchmarking methodology will be my recommendation for SMEs where they can acquire practical knowledge transfer. This will be the focus of my presentation in this APEC SME 2001 conference.

4.0 What and Why of Supply Chain Consortium Benchmarking ?

Working as the SCM subject matter expert for the Asian Benchmarking Clearinghouse at the Hong Kong Productivity Council, we launched a Supply Chain Consortium Benchmarking Study in early 1999. This was basically a program administered for a group of people from nine different companies to get together with a common goal of doing benchmarking on supply chain best practices through a guided methodology of scoring their practices, site visit with best practice partners, and knowledge transfer. Since benchmarking is a methodology of comparing and improving best practices, the site visit guide helped participating partners (including SMEs) systematically learn about the supply chain related best practices. The subject mater expert would summarize the benchmarking score of the group with other world-class scores and conduct a knowledge transfer to ensure that they have learned from the benchmarking processes.

Most SMEs are constrained by limited resources and a lack of an effective methodology and even a clear understand of the concepts of benchmarking and supply chain. These companies need support, expertise, and even real life examples to learn from. Thus consortium benchmarking study may be the most suitable method for SMEs. By participating in these consortium benchmarking studies, they are able to gain all of the benefits of benchmarking while investing less time and money. Benchmarking a major business process, if left on its own, could be very costly and sometimes suffer from high risk of mistakes as well.

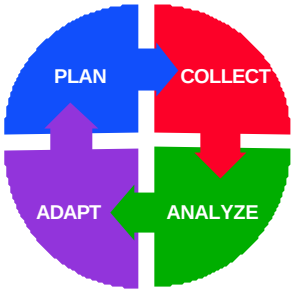
With the awareness of these constraints, how can we approach the complex task of promoting more effective supply chain management practices for SMEs? Can we help to forge strategic alliances with larger leading companies with best-in-class practices that SMEs can learn from? What is the best way for SMEs to learn and do benchmarking? As mentioned earlier, I believe that the methodology described in supply chain consortium benchmarking is one of the best ways to help transfer learning and performance improvement for SMEs.

5.0 Consortium Benchmarking Methodology

The consortium benchmarking methodology is adapted from APQC's consortium benchmarking methodology that was originally developed in 1993 and serves as one of the premier methods for successful benchmarking in the world. It is a powerful tool for identifying best and innovative practices and for facilitating the actual transfer of these practices. This five-phased approach and follow-up is presented below:

Phase 1: Program Planning

The planning phase organizing team will need to prepare the promotional materials, appoint the subject matter expert, communicate with a few of the foundation best practice partners, prepare the supporting materials, venue, schedules and call up potential participating partners. There may be one or more pre-benchmarking study sessions to fine tune the expectation and need of the participating partners. If the participating partner pays for part or all of the cost of conducting the study, they are also known as sponsoring partner.



Phase 2: Program Kick-Off Session

When all preparations are ready and the participants (between 7-15) are firmed, an official kick-off meeting is officially launch. The subject matter expert or a specialist should give a high-impact presentation to ensure that participating members have a good grasp of the foundation concepts and improvement techniques of supply chain management, benchmarking, best practices, and most importantly the benefits and value expected in applying benchmarking of the participating companies. The performance process should include the basic functions of plan, source, make and deliver. On top of the basic functions, other dimensions of best practices may include strategy, strategic alliances, collaborative relationship and enabling technologies.

As part of the kick off session, the participating partners will brainstorm to identify further best practice candidates and list the area which they think they would like to benchmark or improve in particular. This process should result in the compilation of a further list of site visit candidates. Normally there can be anywhere between three to seven best practice partner sites.

Each best practice site candidate will be contacted and invited to participate in a screening interview to identify best practices that they are able to share with participating (non-competitive) benchmarking partners. Based on the result of the interview, as well as the company's willingness and availability, the study team confirms the selected site visits.

Phase 3: Data Collection

The study team will collect data from the participating benchmarking partners via three separate data collection tools:

- Screening Questionnaire: quantitative questions designed to collect objective and quantitative data, which are used to determine companies' candidacy for hosting visits;
- Detailed Questionnaire: quantitative questions designed to collect objective and quantitative data; and
- Site Visit Discussion Guide: qualitative questions designed to collect qualitative information about targeted aspects of strategic planning implementation.

Benchmarking translates the assessment into competitive evaluation. To collect this data, the benchmarking partners participate in half-day "site visits," allowing sponsors to meet with key personnel and share their implementation practices.

The supply chain benchmarking assessment utilizes a diagnostic tool containing a detailed questionnaire, an analysis spreadsheet and high achiever benchmarks.

Phase 4: Benchmarking Data Analysis

The study team analyzes both the quantitative and qualitative information gained from the data collection tools. The analysis focuses on identifying innovative practices and methodologies for supply chain performance and implementation. Analysis of participant data (participating members and best practice partners) forms the basis of the final report.

Phase 5: Report and Adoption

When the analysis is completed, the study team will present the key findings of the study to both participating members and partners of this initiative in a knowledge transfer session. All participating organizations receive a copy of the final report, which showcases critical success factors identified through the research and site visit processes. Participants use this report to begin adopting the use of successful implementation strategies within their organizations.

Phase 6: Follow-up

After the end of the program, the most important measurement of the program is how many and the range of benchmarking and improvement implementations are actually being adopted. Therefore a four, eight, and twelve month follow-up and counseling will be very useful to encourage SME adoptions.

6.0 Recommendation

Although there are many measurement and benchmarking methodologies such as the global ECR scorecard, the balanced scorecard, the supply chain operation reference model (SCOR), for smaller SMEs, the above consortium benchmarking methodology where participants are involved with real life site visit observations and interviews is, in my opinion, the best form of interactive group learning, benchmarking, and knowledge transfer for SMEs. This requires a strong support center to conduct this program.

The participating companies can benchmark against world class organizations as in the Michigan State University (MSU) Study, benchmarking against the national standards, and to benchmark against the participating companies as well as the best-practice partners. No names will be revealed in the report. **However each will provide their own score and how others score them without revealing their names. There is a lot of fun sharing each other's benchmarking experience, site visits and interviews**. Partnership can be formed to further help share benchmarking experience. SMEs need learn to look beyond one's own environment, become more open to exchange ideas and experience, and be able to see and ask about business practices which they may never be able to see had they venture on their own. Benchmarking program through a support center hosted by the national government with a network of supporting professional associations and industrial institutions is the way forward to help SMEs stay competitive and be able to assimilate with the modern supply chain requirements of their customers..

APPENDIX

Sample Site Visit Guide

For Benchmarking Consortium Study

Name: _____ Phone: _____
Title: _____ Fax:
Company: _____
Address: _____

General Instructions

- This instrument is intended to gather information regarding your SCM strategic planning, logistics operation process, and IT capablilities. The site visit guide is designed to facilitate discussions during an on-site four hour interview at your organization's location. It is not required that this document be filled out prior to the interview.
- This guide is divided into the following sections:
- Background Questions
- Section I — Linkages to SCM Strategic Positioning
- Section II — Linkages to Integration Competencies
- Section III — Linkages to Agility Competencies
- Section IV — Linkages to Measurement Competencies

BACKGROUND QUESTIONS

1. The questionnaire is being completed for:

   ☐ The company as a whole
   ☐ A specific business unit
   If so, please list which unit: _____
   ☐ Other (please explain):_____

2. Please give a high-level overview of your company's strategic planning process.
(If possible, please include copies of your organization chart and a process map of the strategic planning process).

3. What triggered your most recent strategic planning initiatives / process?

I. LINKAGES TO SCM STRATEGIC POSITIONING

Strategic positioning or direction refers to the firm's determination of where it's going and who it wants to be in the future. Positioning focus on **what** to do.

1. What is the strategic direction of your company ?
(Strategic direction refers to the firm's determination of where it's going and who it wants to be in the future).

2. How do you link your SCM strategies to your Corporate Strategy? You may wish to discuss it in terms of the follow.
   (a) Process Map or process strategy
   (b) Market strategy
   (c) Channel strategy or Distribution Strategy
   (d) others (please specify: _____)

Note: a) Process concerned with managing a broad group of logistics activities as a value-added chain b) Market concerned with managing a multi-divisional single business or across multiple business units c) Channel concerned with managing logistics activities performed jointly with dealers and distributors d) Other means none of the above.

3. Describe the considerations that motivated your most recent efforts in SCM.

4. Discuss the key elements considered in formulating:
   (a) Market Strategy, for example
      - Integrated goals and measures
      - Inter-organizational communication
      - EDI
      - End consumer e-commerce
      - Alliance development
   (b) Channel Strategy or Distribution Strategy, for example
      - Integrated inventory planning
      - VMI (vendor managed inventory)
      - CMI (co-managed inventory)
      - CPFR (collaborative planning forecasting and replenishment)
      - SCR (supply chain process reengineering)
      - EDI (using electronic data interchange)

5. What are the critical success factors related to SCM strategic planning implementation?

6. What are the critical processes and or methodologies used in the above implementations? Can you illustrate the methodologies with a process chart?

7. Please discuss the concerns that your organization faced in identifying these strategic planning implementation factors.

8. How logistics operations and sales functions are coordinated so that a unified market position is presented to customers?

9. How joint efforts were made with your dealers, distributors, suppliers, logistics service providers … in managing material, product, information and financial flows.

II. INTEGRATION COMPETENCY

Integration competency and capabilities are related to **how to do** it creatively in terms of ways to use resources, acknowledging strengths and weakness, communication and coordination.

10. By what means do you ensure that you functional units are aligned appropriately with strategic direction?

11. Please share your successful cases in process re-design or process improvement of logistics systems that led to higher efficiency

12. (a) What's the percentage of our sales revenue are being invested in IT, in SCM?
    (b) What kind of IT applications are you using? Are they developed in-house or brought from vendor?
    (c) What are the major challenges in IT in the next 3 to 5 years
    (d) To what extend does IT help you to improve resource utilisation and support the firm's strategic goals?
    (e) What is the yield?

13. (a) What kind of information is shared with your trading partners?
    (c) Do you foresee that information sharing such as key technical, financial, operational and strategic data will be significant increased in the near future?

14. Are your key suppliers linked or interfaced with your system? In what way?

15. Do you have demand management or consumer based category management programmes with tangible actions and regular review?

III. AGILITY COMPETENCE

Agility reflect how well are you able to retain success by reacting to changes, the achievement and retention of competitiveness and customer success.

16. Explain how your company manages changing needs of customers?

17. Do your customers require you to do things that are not our core business?
    For example; labeling, packaging, delivery performance, barcode, information provisions, etc.

18. What are the major challenges in retaining competitiveness?
    How do you overcome them?

IV. MEASUREMENT COMPETENCY

Measurement the reflection of internal and external monitoring of performance.

19. Discuss your firm's performance assessment program …
    (a) functional assessment
    (b) process assessment
    (c) benchmarking
    (d) overall measurement program

20. Discuss your benchmarking efforts and results in the following areas:
    (a) product flexibility/customization
    (b) low logistics cost
    (c) delivery speed
    (d) delivery dependability
    (e) responsiveness to key customers
    (f) order fill capacity

(g) order flexibility
(h) delivery time flexibility
(i) advanced shipment notification
(j) asset management
(k) productivity
(l) customer service

21. Have your company implemented activity based costing (ABC)? If yes, are is ABC being used to achieve corporate goals? If not, do you see that ABC will be implemented within the near future?

22. How do you measure the effectiveness of your business plans, action plans, or operational plans against your Supply Chain Strategy or Corporate Strategy?

23. (a) What are the key performance indicators applicable in your company?
(b) Please illustrate your KPI review process.

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Partnership Development: More on Strategic Alliances from a North American SME Perspective

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Abstract
While overall cooperation between North American and Asian SMEs is growing, building effective strategic alliances remains a challenge. . Remedying this shortfall begins by recognizing that alliances are a two-way street: both parties must bring resources to the table and both must benefit. The potential benefits depend on the type of alliance formed, how the alliance evolves over time, how power and assets are shared, and how alliances are integrated into the operations of each firm. While there is no single formula for building a transnational alliance that creates value for both partners, the alliance process generally proceeds through four stages: 1) setting expectations and reaching agreement on what will be included; 2) outlining measures to reduce risk and maintain trust; 3) working together in a period of ongoing and sustained efforts to deliver value; and 4) periodically reassessing strategic directions for growth. At the tactical level, Asian SMEs and their allies need to develop a clear understanding of – and persuasively articulate – what they have to offer potential partners, rather than focusing solely on their own needs. In doing so, they must pay particular attention to understanding North American SME needs and fears. An additional asset is the utilization of outside resources, provided by government assistance programs or other local strategic partners. Overall, transnational alliances can be a tool for growth in the SME sector in Asia, but they are not a one-size-fits-all solution. SMEs that face significant shortcomings in their own operation are rarely good candidates for alliances, precisely because successful alliances need to yield value for both partners.

1.0 Introduction

Alliance-building between small and midsize enterprises (SMEs) remains an art, not a science. Moreover, it is an area in which practitioners have made relatively little progress in capturing best practices. . Facts and figures on the prevalence of alliances, their value, their rates of success, and their evolution remain scarce. The viewpoints expressed in this paper represent the practitioner viewpoint, based on nearly ten years of experience in the Kenan Institute working with Asian and North American SMEs to forge a variety of alliances across a range of sectors and alliance objectives. As such, many of the points made here remain hypotheses, needing further testing with a broader range of data before they could be dignified with such terms as “principles” or “rules.”

This paper will pose and discuss six questions:

- Why are North American-Asian SME alliances relatively rare?
- How can we do better at building these partnerships?
- What are the basic principles of a good alliance?
- What is the process whereby alliances are formed?
- Are there tools and tactics that will promote greater alliance formation?
- How important is transnational alliance formation to Asian SME development?

2.0 Why North American-Asian SME Alliances Are Relatively Rare

Even without concrete data on the number and scope of alliances between North American and Asian SMEs, we can confidently state that alliance formation continues to fall well short of its potential. This is true whether alliances are measured in terms of prevalence (numbers of alliances or participants in alliances), scope (type and scale of activities), or contribution to SME development (revenue, technology transfer, etc.). Many fewer SMEs are participating in alliances than could, at least in theory, benefit from such collaboration, and many of the alliances that are formed fall well short of their potential to contribute to the growth of both partners, North American and Asian.

The first step in remedying this situation is to form a clearer understanding of the barriers to alliance formation, as well as the factors that lead to alliance success. This understanding must recognize that there are barriers to success on both sides – problems and limitations that arise from the Asian side and those, not altogether different, that arise from the North American side. Some of the main barriers that we have observed in our work include the following:

- Lack of familiarity with potential benefits to be gained through partnering
- Difficulty in finding and screening possible partners
- Lack of clarity as to the benefits offered or sought from specific alliances
- Unrealistic expectations regarding what a partner can deliver
- Differing understandings between the partners as to what the alliance can or should deliver
- Communication problems – from cultural barriers to non-functional fax machines
- Differences in legal systems and in approaches to legalization and enforcement of agreements
- Poor internal management systems leading to poor performance of respective roles
- Different understandings as to how fast cooperation should progress

3.0 How We Can Do Better?

Perhaps the most crucial step to improving alliance formation, success, and, most importantly, the value that SMEs derive from alliance formation, is to help both firms develop a common understanding of how to approach alliance formation. In many cases, we have found that companies that want to work with each other – and that possess a range of assets and skills that would make them good partners – have failed to form an effective alliance because they did not share a common understanding of what they were seeking to achieve.

Simply bringing partners together or publicizing opportunities will not be sufficient. Partnerships often require active intervention to get beyond the negotiation stage and into actual implementation. Even then, few partnerships survive beyond their initial stages, even those involving major companies that can draw on considerable outside resources to support their ongoing collaboration.

Since it will be difficult for most APEC member economies to generate the level of resources needed to work with each alliance individually, it is important to develop a general set of resources that SMEs can draw upon strategically. Examples include training for companies in the basics of partnering, so that they are more likely to succeed on their own; encouraging companies to enter into more partnerships, but to expect less initially from each partnership they enter; and helping companies to understand and embrace the evolutionary and even organic nature of partnerships, rather than expecting to realize a high level of results from partnerships that are still in their early phases. In priority sectors, such as information technology, providing more active support to partnering may be appropriate, including assistance to individual companies in seeking partners. The simple fact that a sector is a priority for an APEC member economy, however, does not change the rules of the game: partnering still requires a lot of work on both sides, an effort that only makes sense to both sides if they each derive significant benefits in return for all that work.

4.0 Principles of Alliance Formation

When we talk about alliances, there is a natural tendency to focus on the upper tier of SME collaboration: joint ventures involving shared investment, joint technology development, and similar long-term commitment of equity. Such alliances, however, represent a tiny fraction of the activities linking SMEs in North America to counterparts in Asia. As such, they are neither the only channel nor even the main channel through which technology transfer, technology collaboration, and market expansion occur.

The typical SME is far more likely to participate in an ongoing commercial relationship as a buyer from or supplier to a foreign company, rather than in a joint venture or technology development agreement. Although the depth and speed of technology transfer is generally much lower in such routine transactions than in a joint venture, the total level of technology transfer realized by the SME population as a whole is likely to be much higher, simply because commercial relationships are so much more common and so much more likely to succeed.

4.1 What Is an Alliance?

Recognizing the variety of joint activities that firms can undertake together, we do not limit our discussion here to joint ventures, but instead expand the definition of alliances to include a broad range of business relationships. Instead we define an alliance as:

> ***A long-term, mutually beneficial business relationship between two (or more) entities in which each side relies on the other to provide goods, service, information, or other support critical to its sustained business success.***

Several features of this definition are noteworthy. First, while this definition is broad, it is not so broad as to include any type of commercial transaction. To be considered an alliance, the collaboration must be long-term, it must involve a core business process of each partner, and, most importantly, it requires that each party rely, to a greater or lesser extent, on the performance of the other. In other words, an alliance, by definition, involves risk. In an alliance, the success of each party *depends* on the performance of the other. Loss of the alliance relationship or failure of the alliance partner to perform imposes costs on the counter-party.

4.2 Types of Alliances

Within this definition, there are many types of business relationships that constitute alliances. While the following is not an exhaustive listing of all of the ways that businesses form long-term relationships, it may be useful as a list of the most important forms of collaboration. These include:

- Distribution and agency agreements
- Subcontracting of production involving intellectual property content
- Long-term buyer/supplier relationships
- Licensing agreements
- Joint ventures
- Joint technology development/research and development
- Equity participation

4.3 Evolutionary Nature of Alliances

Even if a company is primarily interested in one of the "higher orders" of alliance, this is rarely the appropriate place to start. Successful alliances evolve. Many of the most successful alliances started as distribution or subcontracting relationships, including some of the largest joint ventures.

The reason for this evolutionary pattern is simple: experience working together reduces the risk in partnering. The higher the level of partnering, the greater the risk inherent in working together. If a distributor fails to perform, it is relatively easy, in most economies, to get a new distributor. There is still a considerable level of risk: loss of customer goodwill, loss of potential market share, loss of the investment in training and equipping the distributor, perhaps even costly legal expenses to extricate oneself from the relationship. If a joint venture partner fails to perform, however, the potential loss is much greater. In extreme cases, the failure of a joint venture can bring down one or both of the parent firms.

To minimize or at least control risk, North American companies generally prefer to take an evolutionary approach to their relationships, including those with Asian partners. By beginning with relatively low-risk relationships, such as distribution and subcontracting, the company can accomplish two aims. First, it can learn more about its partner and the joint business they are undertaking as it goes along, postponing a decision to enter into a higher risk relationship until there is more information and therefore an increased ability to measure, and deal with, risk. Second, it can "lock in" the benefits that it knows can be

found in such relationships in the immediate term, realizing sales or acquiring needed inputs, even as it is developing the relationship. Over time, if the relationship is a success and the joint activity thrives, these many benefits provide the basis for a closer relationship, creating opportunities for increased benefits through closer alliances as the relationship evolves.

Part of the benefits of partnering derive from changes in the partners themselves, as they work together. Not only do they learn about each other's strengths and weaknesses, but each partner actually gains new skills and experience levels that may enable it to overcome its previous weaknesses and build up its strengths, becoming a more valuable partner as time progresses. Not least of these long-term benefits is the accumulation of capital, particularly on the side of the smaller partner (often on the Asian side). Over time, a successful distributor becomes a much more valuable partner, acquiring market knowledge, building up a skilled staff, establishing a market presence, and developing its financial strength. All of these are assets that can be brought to the table for a higher-level alliance, with existing partners and with new ones as well.

4.4 Power and Assets in an Alliance

Commentators (Rondinelli and Black, 2000) have noted that the process of alliance formation is greatly affected by two sets of characteristics: the relative ***power*** that each partner has to control the terms of the alliance and the ***assets*** that each partner brings to the alliance. The first characteristic, power, is clearly related to the size, asset base, and market scope of each partner. But it is also affected by the context of the specific alliance under consideration. For example, a company with a strong market share in a given product area may have much more power than a proposed partner with limited market share, provided that the alliance will focus on that particular market.

Similarly, each potential partner's assets may be considered a characteristic that they bring with them to the partnering table: how much capital do they have, what relationships do they have, etc. But at the same time, it is not so much the total level of assets as it is the willingness to *commit* assets to the partnering exercise at hand that determines each partner's asset value. A large, wealthy partner that is not prepared to share its contacts or to invest its resources in the partnering activity may be outweighed by a smaller but more committed partner.

This is an important factor in assessing possible North American-Asian partnerships. In principle, since the Asian partner will often perceive that it has more to gain from the alliance, it should be willing to put more on the table. It would therefore be able to claim a proportionately large share of control in the alliance, even in cooperation with a much larger partner. Often, we see that the reverse is the case, however: the Asian partner may feel that it should put less on the table than its wealthier proposed partner, but still claim a large share of the management authority in the new alliance. This is not realistic, in most cases, and can lead North American partners to abandon the exercise as not offering enough to make it worth the risk and expense.

4.5 Value of Local and Transnational Alliances

Financial and physical assets are by no means the only assets, or sources of power, that a potential partner brings to the table. Increasingly, we find that it is not so much individual firms that compete in the global marketplace, but rather alliances or networks of firms that compete on a global basis. This alliance factor holds true whether the firms in the network are large or small, or a combination of the two.

One of the most important assets that an Asian or North American firm brings to the table is its network of local and transnational alliances. Both types of alliances are important. To take a simple example, an Asian distributor is more valuable to a North American manufacturer if it has established relationships with a large customer base. A U.S. supplier can be a more valuable partner for an Asian firm if it is willing to tap into its network within the industry, helping the Asian firm to add new suppliers or learn about new technologies. Whether a firm chooses to identify, assess, and deploy these assets in the partnership is a key determinant of the value that it brings to the table, and therefore of its attractiveness to potential partners.

5.0 The Alliance Process

With these principles in mind, how can we approach the complex task of promoting more effective and mutually beneficial partnerships between North American and Asian SMEs?

In our experience, the starting to point in promoting more effective and mutually beneficial partnerships is to consider each potential partnership as a table, to which the proposed partners are invited for a possible collaboration. We have found the metaphor of the table, and the transactions that take place around it, to be very helpful in structuring the elements needed for successful partnering. This experience has led us to formulate what we call the "Rules of the Table."

5.1 The Rules of the Table

There are three "Rules of the Table":

> ***Rule 1:*** Partners will be at the table for *implementation* only if they are at the table during *planning.*
>
> ***Rule 2:*** To bring partners *to the table*, there must be something of value *on the table.*
>
> ***Rule 3:*** Each partner must *bring something of value* to the table and *take away something of greater value* from the table.

Let's look briefly at each of these. First, a partnership is the result of a negotiating process, in which each party seeks benefits at the least possible cost. Since only the partners themselves can accurately assess what each is seeking and how much this is worth, the partnership cannot be designed until all necessary parties are at the table. Only when the main parties are assembled can the mix of inputs, activities, risks, and rewards be defined such that it is suitable to each partner and to the group as a whole.

This rule may seem fairly obvious, but, obvious or not, we often see it violated. For example, one of the would-be partners may develop the proposed partnership fully, spelling out the inputs it needs and, equally important, the benefits it offers and *then* go looking for a partner. This model rarely works, because the very process of defining and developing the partnership is a critical tool that each partner uses to assess the others, and to determine whether the partnership is attractive.

This can be very frustrating to the partner who has put a lot of work into planning a partnership, only to receive a flat refusal to what they feel is a very attractive idea. For better or worse, people need to feel ownership in a concept before they can become committed to it. This ownership can only be achieved by involving key partners in the process from the very beginning, or as close to the beginning as possible.

The second rule addresses a question that flows directly from the need to define the partnership *after* the partners are assembled. If you cannot define the benefits and even the program to be undertaken, how do you bring partners to the table in the first place? The answer is as old as salesmanship: offer them something they want.

This "something" need not be related to the proposed partnership at all, any more than the nice lunch offered by a salesman bears any connection to the product he is trying to sell. Rather, it needs to be something that will entice the right partners to come to the table. If the organizing partner is a government agency, this "something" is often money. Perhaps they are offering grants to potential partners, or access to special investment funds. The item on the table often can bring partners into discussions, even if their initial interest in partnering is low. For a private company, the "something" rarely will be cash; it is more likely to be access to a preferred customer, information on a near-term market opportunity, or some other piece of useful market information.

Whatever is offered as enticement to come to the table, it must be offered without obligation. By definition, the potential partners are not ready to commit at this point. In addition, the organizing party must carefully choose what they offer. It should be something that demonstrates their commitment and communicates their value to potential partners. Continuing the above example, the organizing partner may offer its market contacts as the real "something", but provide an initial contact without obligation to demonstrate that they really do have contacts of value to the other parties. When the value of what is on the table is difficult for the partners to assess, then a small "gift" to demonstrate value is extremely useful.

The third rule gets to the very essence of the partnering proposition: no partnership is worthwhile unless each partner provides some of the resources, and gains back benefits in excess of what it has contributed. In other words, the partnership must create value, with a sum equal to more than the partners could have generated individually. Partnering is far from cost-free, and the net addition to value must be sufficient to overcome the risk, doubts, and investment of time associated with partnering.

It is not sufficient for the table's "value-added" to be positive for all of the partners as a whole. The partnership must also generate net value for *each and every* partner. A partnership is a transaction, at its root, and no one will enter into a transaction that does

not offer value nor continue an ongoing transaction that does not offer sustained value. The would-be partner must therefore carefully assess the potential cost and benefit for each partner invited to the table. Even though the final measuring of the "value proposition" cannot be tallied up until the negotiation is complete, the organizing partner must feel reasonably confident that it can offer real value to each partner it really needs to have at the table for success.

5.2 Setting Expectations

This brings us to the complex topic of expectations. By this we mean, what does each partner expect to get out of the alliance, and what do they expect the *other* partners to provide, and to receive? Particularly when the partners on both sides are SMEs with limited partnering experience, we have often found that the gaps between prospective partners' expectations can rapidly grow into unbreachable gulfs. What may seem to one partner to be a very reasonable, even modest, expectation, may seem hopelessly aggressive and unrealistic to the other partner. To the Asian partner, for example, it may seem that the North American company is large (relative to itself) and the opportunity a sure-fire financial success. Therefore they expect the North American company to provide a significant share of the investment capital needed. The North American company may have very different expectations. Since they are not the lead or organizing partner, and may have very limited experience in the country, they may assume that their initial financial commitment will be limited, or even nil.

This type of mismatch in expectations occurs with such frequency that we have developed an approach we call "managing expectations" as a response. This approach is not particularly scientific, but consists of asking each partner to state what it is they are looking for, at each stage of the process. Whether the communication gap arises from cultural differences, communication problems, different perceptions of risks and rewards, or simply inexperience, there seems to be no substitute for asking each party, early and often, to state what their expectations are for the next stage in the process.

5.3 Reaching Agreement

Assuming discussions reach this stage, with benefits and contributions for at least initial partnering spelled out, it is then necessary to move to some type of agreement. Opinions among practitioners differ as to whether a precise written agreement is preferable when both parties are SMEs. Sometimes a written agreement is unavoidable, of course, as when a company proposes to purchase a technology license or enter into a long-term distribution agreement.

We have found, however, as have many others working across the Pacific divide, that North American and Asian firms have very different ideas as to what constitutes an adequate agreement. What seem like simple commonsense protections to a North American firm may appear overly suspicious and unreasonably demanding provisions to an Asian firm. What seem like clear-cut, no-nonsense provisions to a North American firm, to be followed to the letter, can seem like general guidelines to an Asian firm, to be modified or even ignored if conditions warrant.

This difference represents a fundamental variation between business practices in North America and Asia, and therefore does not have an easy solution. Perhaps the best strategy for the Asian firm seeking an alliance is to accede to the North American model, despite its unwelcome legalism, recognizing that the North American firm may well not be willing to accept less specificity than it would at home. Support intermediaries can play a helpful role here, in assisting the Asian SME to understand the different role that formal contracts play in North American business, and to see formal documentation as a way of doing business, rather than as a sign of mistrust.

5.4 Reducing Risk

Unresolved differences of interpretation and expectation are only two of the many sources of risk in an SME-SME relationship. Risk is inherently higher in most SME alliances because, unlike larger firms, SMEs are more likely to be engaging in activities wholly new to them, such as international trade or transnational partnering. The combination of lack of experience in the underlying business activity, absence of experience in the partnering process itself, and little or no experience working with the specific partner in question adds up to high risk. Moreover, the underlying environment in which SMEs operate is riskier than that facing larger firms, even before the additional risk of a new activity with a new partner is added to the mix. It is therefore critical to design the alliance strategy in such a way that it reduces the risk to which each of the parties is exposed. This reduction must be a "net" reduction in risk, taking into consideration ways in which the risk of the new activity and the planned partnering activity each add to and subtract from the risk level faced by the SME.

There are two basic strategies for controlling risk in an SME alliance. First, the activities of the alliance can be structured to draw on the synergies between the two partners. Wherever possible, the partner that has the most knowledge of a specific task (e.g., developing a distribution chain) should be assigned the lead in that task. Ideally, the capabilities of each partner will complement each other, so that the total risk is less than it would have been for either alone. If this is not the case, the alliance has very little chance of success.

Second, the process of alliance formation can itself be structured to reduce risk. One way to do this, for example, is to develop the alliance in relatively small steps, rather than asking each organization to make a major or irrevocable commitment up front, as noted above. Rather than starting with an equity investment (highly risky), the alliance might start with a distribution agreement (much less risky). Then, as the partners learn more about each other, and thus reduce the risks inherent in the alliance itself, they can move on to more complex and deeper levels of collaboration, taking on more risk in terms of activities or commitment as partnering risk is reduced through growing experience together.

5.5 Maintaining Trust

The greater the need for the parties to rely on each other for success, the greater the need to build and maintain trust. This challenge is especially great in North American-Asian SME alliances because cultural differences, at least in our experience, tend to be quite high in the area of commitment. What an Asian party sees as a firm agreement, the North

American party may see as a loose framework, and vice versa. Unless both actors have extensive experience in each other's culture, these differences can be very hard to diagnose and identify. When one of the parties appears not to have lived up to a commitment, is it because they are untrustworthy or because they had a different understanding of the commitment?

For example, it may appear to a North American manager that an Asian manager has agreed to a specific request, whereas, to the Asian manager, what looked like agreement was in fact a carefully hedged "formal" expression of assent, indicating a desire to continue talking, but by no means an actual agreement. Since this distinction would have been perfectly clear to the Asian company's established Asian partners, the Asian manager may not understand why the North American manager is suddenly and angrily insisting on something that has not, in their view, been agreed to at all!

Given the geographical distance, infrequency of personal contact, and cultural differences, it is therefore necessary to build in mechanisms to promote and maintain trust. Without such mechanisms, it is difficult to sustain an alliance, even if the underlying business case is strong. The involvement of outside resources offers one of the main channels for reinforcing trust in the relationship. For example, the use of an outside auditor to review and approve financial transactions may help assure each partner that the situation is not being misstated. Building in non-judicial procedures for dispute resolution, such as mediation or arbitration by a trusted third party, offers another mechanism. A third option is the regular use of two-way written communications to capture and reinforce agreements, even on small points. Through this process, each side restates each agreement as it is reached, to be sure that they both have the same understanding of what they have actually agreed to, or to correct misunderstandings early on.

5.6 Delivering Sustained Value

No matter how skilled the alliance formation and maintenance skills of each partner, no partnership can survive if it does not continue to deliver value to both parties. This creates a need to deepen and expand the partnership over time. It cannot be assumed that the initial set of activities will continue to deliver value over time. On the contrary, as the alliance progresses, it must either grow or die.

Suppose, for example, that the North American company is serving as a distributor for the Asian company, which is initially inexperienced in the North American market and therefore is very heavily reliant on its intermediary. Over time, the Asian company will learn more about the North American market, and the value of the distributor will decline. If the partners have not paved the way for further developing their relationship, to the next stage, it may well fall apart at this point. To sustain the partnering, each party must continually seek out new ways to add value, as old sources of value decline.

This dynamic is another reason why evolutionary approaches to partnering tend to be more successful than large-scale all-or-nothing attempts to form a joint venture.

Another value-limiting dynamic in maturing partnerships arises from disparities in the approach to exchanging information. One partner may seek to withhold information,

such as customer identities, in an attempt to preserve the value of the partnership. The other partner may perceive this action as a lack of trust or trustworthiness, and pull back from the relationship. Even if they do not, the withheld information may limit the partner's ability to generate value through the partnership (perhaps by identifying additional customer needs that could be met through different products). The very strategy adopted by one partner to preserve the partnership's value may, ironically, actually undermine value over time.

Approaches to information-sharing represent another area where cultural differences are inherently difficult to bridge. Different cultures have different approaches to sharing information, both within the group and with outsiders. In an ideal world, the two partners would discuss openly what information they are withholding, why they are doing so, and how they could be made more comfortable sharing information. This is probably unrealistic, particularly when partners are not already close collaborators.

This barrier has no easy solution, and should therefore be highlighted as an area deserving particular attention from support intermediaries in order to overcome difficulties arising from differential willingness to share information.

5.7 Setting Strategic Directions For Growth

These natural processes – "value decay" and the changing value of information in a partnership – are difficult to overcome directly. An alternative is to build in a process of continual rethinking and forward planning, so that future growth and strategic redirection of the partnership occurs on an ongoing basis. As one set of activities declines in value, another set of activities is therefore already being developed to replace "decaying" activities or overcome limited information.

This continual reinvention process cannot be postponed until the decline in value is evident to both parties. In many cases, the value for one partner will decay more quickly than the value for the other, so that one partner leaves before the other partner even realizes there is a problem. Continuing the previous example, the Asian company may no longer perceive the distribution agreement as particularly useful, while the North American company may still see it as very profitable. In this situation, the Asian company may well abandon the partnership, perhaps setting up its own distribution system.

While this type of evolution is natural and may be desirable, it also may represent a costly loss of potential value. The two parties are abandoning the investment, often a large one, that was necessary to enable the partners to get to know each other and learn to work together. A more effective strategy might be to build in a process of ongoing communication between the partners, creating opportunities for senior managers to rethink, reinvent, and reinforce the partnership by setting new strategies for its future. Perhaps its value has in fact run its course, but it is equally possible that the partners can build on their past success to take the alliance to the next stage, or to establish wholly new and highly beneficial joint activities, provided that the "value decay" process has not progressed too far.

This is not to say that any and all alliances must be maintained indefinitely. If the mutual search for new sources of value is not successful, then a partnership should be terminated amicably, rather than preserved beyond its useful life. This is a difficult decision, but one that may be made easier by recognizing the value of the new partnering skills built and the opportunity to restart the partnership at a later point if new opportunities arise.

6.0 Tactics of Alliance Formation: Using Outside Resources

The foregoing may create the impression that alliance formation is a complex process, one requiring continual investment of resources, and prone to failure. Unfortunately, this impression is correct. This section examines some of the available shortcuts to alliance formation that can help SME support organizations to increase their effectiveness, and assist SMEs to form partnerships at a lower cost to themselves.

6.1 Government Assistance

Government assistance programs are poorly positioned to offer tailored, one-on-one assistance, because such assistance is quite expensive. They are far more effective in offering standardized services that can be provided to a wide range of firms in a similar situation, or in offering very limited one-on-one support. The issue is not lack of capability, but lack of resources. The combination of small, under-funded government programs with the large number of potential clients and a service model offering intensive, tailored services is not sustainable. Either the program reaches a large number of companies, but serves them badly, or it provides good support, but to only a relative handful of firms.

The challenge is therefore to support partnering in ways that are not resource-intensive and that are suitable to reaching large numbers of firms effectively. This need is most compatible with a standardized services model, not a model relying on intensive, tailored services.

This dynamic supports a recommendation that government programs focus their limited resources on helping companies develop early-stage, small-scale partnerships, rather than seeking more complex, risk- and resource-intensive partnerships. This is not to say that simpler partnerships are preferable to more complex partnerships, in terms of development or economic value delivered. It merely recognizes that simpler partnerships require less support and, equally important, that successful simple partnerships have a good chance of evolving into the complex partnerships that governments tend to consider more desirable.

Indeed, although it is not possible to back this assertion with concrete evidence, our experience strongly suggests that devoting effort to small-scale partnerships will ultimately yield a greater number of complex partnerships than would a strategy targeting such alliances directly. The argument behind this assertion is simple: it is relatively easy to create successful small-scale partnerships, and successful small-scale partnerships tend to grow into successful complex partnerships. By contrast, creating joint ventures or research-and-development projects between SMEs is very, very hard, and rarely succeeds.

Government programs should not stop with forming these simple partnerships, however. They should also work with companies that are *already* in some type of successful partnership to help them move it to the next level. This may involve training in ways to address some of the strategic challenges outlined above, such as dealing with value decay or maintaining trust across cultural boundaries. This type of assistance is well-suited to delivery as a standardized service (as a training program, for example), and is generally overlooked, in our experience. Regular association with successful partnerships also builds the skill and understanding of government SME program staff, and therefore brings additional value to the government program in terms of better program design on all levels.

6.2 Local Strategic Partners

A second area where both government programs and SMEs' individual partnering efforts can be strengthened is in the use of local strategic partners. These partners include business service providers (lawyers, accountants, etc.), business associations, and, perhaps most important, global businesses that are present in the marketplace.

We have observed an increasing willingness to work with associations and other nonprofit intermediaries, but collaboration with for-profit service providers remains relatively rare in government programs. These groups can be perceived by government agencies as competitors, whereas in fact they are strategic allies. It is as important to develop *their* skills in partnering as those of the SMEs themselves, since each of them works with dozens of SMEs and because the services of business support firms – lawyers, accountants, consultants – are vital to helping partnerships bridge gaps in the SMEs' own capacities.

Moreover, private service providers have a direct interest in supporting partnering among their clients and are likely to be able to offer the very same intensive, tailored assistance that government programs simply do not have the resources to offer. Fair or not, it seems to be true that SMEs will not pay government programs for this type of assistance, but will pay their accountant or lawyer.

This is true only *after the partnership has reached a preliminary agreement*, however. Before that point, few SMEs will pay for assistance, whether in finding a partner or defining potential collaboration. The reason is simple: the value of such assistance depends on the value of the partnership it produces, and there is just not enough information to make that value-for-money calculation until a solid partnership is on the table. This is precisely why government-provided assistance at the very early stages of partnering can be most useful.

Collaboration with multinationals present in the national marketplace is even more infrequent than collaboration with for-profit service providers. SMEs rarely reach out for partnering assistance to global companies they are doing business with, either because the relationship is too valuable to risk making an unwelcome request or because it simply does not occur to them to try. Government SME programs seldom have sufficient contact with multinationals or experience in forming partnerships of their own with these firms. The result is, on the one hand, SMEs with an untapped asset in the form of multinational business contacts that could yield new alliance opportunities, and, on the other,

government programs that have a mandate to partner and experience in partnering, but that have generally not developed a base of contacts with local multinationals, on which they might build to develop new partnerships for their SME clients.

We would argue that multinationals may now be relatively open to this type of help, if they are approached by the SME intermediary with a modest request for assistance. Multinationals are already familiar with the idea of assisting the SMEs in their value chain from their experience in their home markets in the United States or Canada. These marketplaces are characterized by a much higher level of expectation than are Asian markets regarding corporate social responsibility, including involvement in local enterprise development. Support to local SME partners is simply a part of doing business for many large firms in North America, particularly where local community leaders eager to create jobs in low-income areas or build up their local companies have put pressure on larger companies to show commitment to inner city businesses.

Assistance to SMEs by large companies is a relatively new concept in developing countries, but one that offers considerable promise for strengthening the partnership-formation process. Large companies that are already working with local SMEs (generally as suppliers to the multinational) have an interest in their success and also have a wealth of contacts among North American SMEs. Helping to bring their partners in each market together can be an attractive "win-win" opportunity for the multinational.

More and more companies are seeking to replicate their community involvement programming outside of the United States, and may well be more open to this type of collaboration than they would have been even five years ago. This remains an important and fruitful area for future experimentation and research.

7.0 How Important Are Alliances to SME Growth in Asia?

Alliance-building provides a useful strategy for supporting SME development in Asia and North America alike, but it is not sufficient in and of itself. SMEs that are good candidates to succeed as partners generally have sound management systems, solid products, and a reasonable level of capitalization. Where these business essentials are lacking, partnering does not offer a sound approach for SME support. Moreover, partnering requires a commitment of resources, especially in its early stage. A company that is struggling to deal with product quality, management systems, or financial difficulties should devote its attention to those problems as priorities, and not waste scarce management resources on a partnering strategy that is unlikely to yield success.

Transnational partnering should be an element in a comprehensive SME development strategy, but it is not the first priority, either for government SME programs or for Asian SMEs themselves. Partnering can bring success to SMEs, but only if partnering builds on a sound foundation of solid business practices. Helping firms to lay this foundation remains the core task for SME development, whether the SMEs assisted are already involved in international alliances, choose to seek out new alliances, or focus their efforts on building success at home. Alliance-building is an important element in SME development, but not one that should be stressed to the exclusion of equally important assistance in core skills such as marketing, cost control, quality, and finance.

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External Environmental Barriers for Supply Chain Management

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Abstract

Under increasing pressure from globalisation and technological advancements, competition is rapidly shifting from a firm versus firm perspective to a supply chain versus supply chain perspective. The result is an inclination towards more competitive strategic alliances and partnering within the supply chain. However, internal and external barriers have been reported to hinder the smooth development of such alliances. This paper discusses and presents some issues pertinent to the external environmental barriers that confront business in general and SMEs in particular. Some practical measures to help reduce the effects of these barriers and improve the efficiency in the supply chain are mentioned. Specifically, we provide a brief account of how Singapore has employed some strategic courses of action to help local firms overcome such barriers. The roles and functions of the various agencies responsible for nurturing and providing the best environment to support and help MNCs and local SMEs achieve optimal SCM performance are highlighted.

Keywords : Alliances, SMEs, SCM, Barriers

1. Introduction

One critical aspect of running a manufacturing or service enterprise today is the need to effectively manage the supply chain of subcontractors, job shops, strategic partners, and others. Such onerous coordination can make or break a company but is especially important with the continuing trend toward outsourcing, globalisation and decentralization. For a single firm to trod along this route is virtually impossible given the set of limited resources available. Put simply, it suffices to say that no enterprise is an island of itself.

Already, there is recognition that competition is rapidly shifting from a firm versus firm perspective to a supply chain versus supply chain perspective. In response to this paradigm shift, firms seeking competitive advantage are, either reactively or proactively, participating in co-operative supply chain arrangements. Essentially, they are using such mechanisms to become agile and responsive in a global economy. Some of these arrangements manifest themselves in the form of strategic alliances, which reportedly seek to combine the individual strengths of the various players (firms) in the chain and their unique resources. Indeed, strategic alliances have grown in importance with the recognition that suppliers can contribute expertise which enhances competitive advantage across borders (Ellram, 1992). In doing so, synergy is derived and a symbiotic relationship is fostered. For instance, buyer-supplier sourcing relationships have been a primary focus of alliance improvement efforts, albeit at different parts of the chain, such

as tier 1 and tier 2 manufacturers, and P&G and Walmart. While interest in such arrangements remains strong, it is also well accepted that creating, developing, and maintaining a successful alliance is a very daunting task. There are strong grounds to justify this reason. We will attempt to mention and elaborate on some these internal and external barriers later in the paper.

In the meantime, it is appropriate at this juncture to mention that this paper addresses several critical issues regarding that challenge of abating all barriers that impede the chain partners' attempts to become more agile and responsive. As a result, we pose the following research questions. First, what factors contribute most to the impediment of long-term supply chain alliance successes? Second, what conditions define the presence of those impeding factors? Third, do actors in the context of supply chain partnering agree on those impeding factors and defining conditions? Fourth, within an alliance's intended win-win foundation, do suppliers, chain catalysts and the chain partners recognize their innate dependence on the external environment for success and survival? Further, some of these barriers are not only logistical in nature but also commercial in structure. Given this setting, there is an obvious and immediate need for the study of this major and nascent area.

The rest of the paper is thus organised as follows. Section 2 addresses the various forms of co-operative relationships found in the supply chain today, with particular reference to alliances or consorting among the SME players. Section 3 then develops the notion of barriers, especially that of the external environment, i.e. geographical, political, legal and economic, either to the firm or the whole chain. This is in contrast to the internal environmental barriers faced by an organisation within a supply chain, i.e., management systems, functional structure, organisational culture, and inter-departmental relationships. It further introduces the barriers unique to the SMEs. Section 4 then proceeds to prescribe some practical measures to reduce the effects of these barriers to improve efficiency in the supply chain. The roles and actions of the different players in the supply chain, i.e. the chain partners and public sector agencies are highlighted. Section 5 proceeds with an account of how Singapore has employed some strategic courses of action to help firms overcome such barriers. The specific roles of the Trade Development Board (TDB), Productivity and Standards Board (PSB), and the Economic Development Board (EDB) in nurturing and providing the best environment for supporting SCM performance for MNCs and local SMEs are mentioned in Section 6. The paper then concludes with Section 7.

2. Co-operative relationships between supply chain partners

As noted by Corbett et al. (1999), the open exchange of information and coordinated decision making typical of a long-term supply-chain partnership can reduce the inefficiencies inherent in less collaborative relationships, such as excess inventories and slow response. Different from project-based partnerships, supply-chain partnerships are characterized by a level of investment that further improves the joint supply chain to mutual advantage. In the case of a traditional buyer-seller relationship setting, well-managed and organised strategic alliances enable buying and supplying firms to combine their individual strengths and work together to reduce non value-adding activities and facilitate improved supply chain performance. The more open-ended nature of supply-

chain partnerships makes them more challenging, particularly when it involves cross cultural, cross national boundaries and cross organisation issues.

The notion of co-operative relationships has been receiving increasing attention in the literature, be it in the form of mergers, collaborative arrangements between departments, or total partnerships. Sergienko (2001) mentions three basic forms of co-operative relationships between firms that are currently found in the developed market economy, namely, 1) relationship that involves a condition of various forms of joint ownership of assets, 2) a system of relationships structured on contract agreements, and 3) informal co-operative agreements. Using Sergienko's thesis, a strategic alliance can therefore be classified under one or a mixture of these three basic forms. If one has to define strategic alliances in the context of supply chain management, then a simple working definition could be crafted as follows. A strategic alliance is a formal, long term relationship between two or more firms in the chain, where all, some or none of the firms maybe domiciled in different locations. The alliance relationship involves linking some aspect of the firm's business toward a common end. This would then necessitate the sharing of relevant and material information, the risks and rewards of the relationship. The motivation toward strategic alliances has to be attributed to globalisation and the correspondent need to reduce time to market.

Today, the fast emergence of strategic alliances between supply chain software providers, consulting organizations and logistics integrators, or among all of these, seems to signal a growing co-dependence and existence in the supply chain arena. Though the term may sound like warfare terminology, a strategic alliance in this context is simply a partnership in which two or more organizations team up to deliver their strongest assets to a certain market or geographic area, thereby ensuring logistical and commercial success. This approach makes smart business sense. Software firms are already bonding with consulting organizations because they regard them as a strong influence in the customer's decisions to purchase and implement software. For the software provider, these alliances increase their chances of gaining some business, without physically having to move into another firm's space.

In order for both parties to remain committed to this form of relationship, however, mutual benefits must exist (Ellram, 1992; Stevenson, 1999). Such studies of successful partnerships have also noted certain key recurring characteristics such as free exchange of information (e.g., sharing cost and demand data) and coordinated decision making to reduce the inefficiencies inherent in less collaborative relationships (Corbett et al. 1999; Whipple and Frankel, 2000). Mutual trust is crucial to reassure firms that information shared with a partner will not be used against them. Longer-term commitment to the partnership encourages parties to invest in further improvement of the joint supply chain to mutual advantage.

Also, it is usual to expect firms that are attempting to establish supply chains in emerging markets or developing economies to foster such developments by forging strategic alliances with either local partner companies or integrated logistics solution providers. However, the literature has reported that firms with such strategic alliances face numerous logistics (and other) barriers (see for example, Ellram, 1992; Pearson, 1998). Pearson (1998), in a study on such firms in China, further mentions that some of these firms have

constructed strategic actions to overcome specific barriers such as communication, unfamiliarity with local business practices, and bureaucracy.

For SMEs, the urgency for them to form alliances is perhaps greater in lieu of the fact that they lack market size, firm size, financial muscles, infrastructural capabilities, and experience in cross border facilitation of trade and logistics. As such, SMEs require stronger strategic alliances to compete effectively in the global marketplace (Welch, 1992). Some attempts at redressing this problem have already been reported in the literature, e.g. for small manufacturing organisations in Eastern Europe (Mezgar and Kovacs, 1999). The next section will attempt to identify the characteristics of such environmental barriers.

3. Types and characteristics of environmental barriers

Undoubtedly, doing business overseas brings an entirely new set of obstacles for logistics and supply chain management. Issues like language barriers, tariffs, diverse currencies, and customs regulations all have to be overcome before a successful international SCM strategy can be introduced. As a result of these problems, many companies have yet to move their supply chains and businesses beyond their native shores. According to Forrester Research, only about 15 percent of U.S. companies conducting business online can fill international orders, and most of those are shipping to just a few countries in Europe and Asia (Shewmake and Sapp, 2000).

Based on Halhead (1995), there appears to be two main barriers to reshaping the logistics chain, namely, internal or external barriers. Internal barriers focus on operational inefficiency or poor utilisation or understanding of the organisational mechanics. Within organizations, different functions or departments often have disparate or incompatible systems and agendas, creating a technical barrier to progress. Externally, supply chains with customers and suppliers are not homogeneous. Participants often have different communication infrastructures, with language, currency and cultural barriers and legislative differences. We now delve into some of these barriers.

Regional differences

Each of the four major world regions is at a different level of internal and external capabilities relative to logistics (Barbalho et al., 1998). Western Europe has the longest history of managing logistics across national boundaries, as well as an infrastructure for intra-regional goods movement and management. This is evident in the amount of intra-European trade that exists today. The Economist reports that Intra-European trade accounts for 35 percent, intra-American trade accounts for 11 percent, and intra-Asian trade accounts for 14 percent. Other significant lanes are the North America-Asia lane, accounting for 11 percent; Asia-Western Europe lane, accounting for 8 percent; and North America-Western Europe lane, accounting for 6 percent. North America more recently has developed intra-regional capabilities due to the expansion of U.S.-based trade to Canada and Mexico. Currently, the Asia Pacific and Latin America lag Europe and North America in logistics capabilities.

Clearly, the different rates of trade, economic and logistics development for each region affect the facilitation of physical inventory and information transfer in the supply chain. Within the Asia Pacific, this disparity is even more stark as the various economies in this region are not developing in tandem themselves. As a result, efficient supply chain management and operations will remain a key challenge.

Political instability

With supply chains that extend into Asia and other emerging markets, there is also substantial political (and often leading to currency) instability that can affect product cost or disrupt supply of critical raw materials, components and finished goods into other parts of the world. This is a strong barrier particularly for supply chains that suffer from long lead times and short product life cycles. An example is that of the toy industry. Johnson (2001) argues that such instability creates risk for suppliers in the chain as it can cause severe and unpredictable supply disruptions.

Currency instability

The late 1990s have taught managers about the benefits and risks of global supply chains. While enjoying the benefits of global markets and cheap manufacturing in less-developed countries, many companies were lulled into a false sense of global euphoria. They forgot that the environment could change overnight. For those operating in Asia, the summer of 1997 was one few will forget. The financial crisis caused plunging currencies and stock markets turned the fast-growing Asian economies on their ears so quickly that most companies were caught by surprise. By the end of the 1997, many of the East Asian currencies had been sharply devalued. For toy makers operating in Asia, the financial crisis dramatically changed the cost structure of their labour intensive products. While cheaper labour might appear good, some toy makers found their supply chain partner failing and unable to pay debts for materials and equipment accumulated in now more expensive currencies.

Restrictive laws and regulations

From a supply chain management perspective, it is vital to understand the impact of government regulations on players in the supply chain. Restrictive laws and regulations can create artificial resource scarcity. The impact of government intervention on resource scarcity is a concern for buyers and suppliers. Rumelt (1987) has described two main types of regulatory mechanisms: (1) exclusive property rights granted by the state, or by another actor, under the authority of the state, and (2) various forms of first-mover advantage. In this way, through its ability to grant and to regulate property rights, the state can clearly play a central role in creating and sustaining situations of resource scarcity. This scarcity may, in turn, confer an unfair, sub-optimal power advantage on a buyer or a supplier. Such creative or disruptive regulations can either help or break an otherwise efficient supply chain respectively.

Related to the rules and legal framework found in many countries today is the evidence of sometimes unnecessary customs delay. As materials and goods traverse from one country to another, borders are inevitably crossed, and any item shipped becomes subject to customs authorities control. The trade literature reports that customs delays can be a bane

to efficient physical flow of goods and for many practising logistics professionals, customs clearance is a necessary evil. Under today's legal environment, moving goods either globally or regionally would implicitly mean having to impede the velocity of goods flow, and exacerbate the extent of documentation handling, to the detriment of fast time to market.

Other barriers

Other external barriers, related to a country's economic and infrastructural maturity include:

1. lack of coordination between different transportation and logistics authorities such as railways, communications, civil aviation, trade, and port authorities. This often leads to excessive (and burdensome) documentation, poor connectivity between nodes and prolonged transit times in the logistics pipeline. As a result, firms have to bear with longer order cycles, unproductive activities and unwarranted increase in operating costs.
2. backward logistics infrastructure of country or region. A supply chain is only as strong as the weakest link in that chain. The quality of the supply chain in turn is predicated by the state of development of the logistics infrastructure, be it hardware (technology, systems, facilities) or software (manpower, knowledge). The absence of either type of infrastructure can lead to low handling capacity, slow responsiveness, less flexibility and decreased productivity.

For SMEs, external barriers can be even more restrictive. While being small allows companies to be flexible and nimble, there are also disadvantages when compared to the larger firms. Increasingly, SMEs will find that they need a certain minimum size to better serve their global customers and compete effectively with other international players. Their barrier to entry in the context of a global supply chain lies in the fact that they lack economies of scale and critical mass.

4. Some practical measures to reduce external barriers

In this section, we elaborate on some generic measures which can be adopted and collectively managed by the public sector and business to lessen the impact of external barriers.

Reduce regional differences by re-aligning logistics operations

One way some MNCs have attempted to overcome the different trade flow rates and logistics capabilities of the four main trading regions is to deliberately dislocate their supply chains to allow for a greater dispersion of the logistics network in a particular region. Such strategic dislocation points can be in the form of distribution centres or hubs. Another way is to outsource the supply chain operations to local logistics service providers who have the domain knowledge and expertise. Political initiatives in liberalizing trade and finance, coupled with technological innovations in information, communication and transport technology, have also stimulated the ongoing process of globalization, indirectly minimising the regional differences.

Reduce currency and political risk through operational hedging

One approach some progressive firms have aggressively adopted to overcome or mitigate the concern over political (and hence currency) instability is to impose a strict discipline of working within a range of coordinated outsourcing strategies; and constantly hedging against political and currency risk by producing in different countries. No doubt, rapid changes in financial markets present both arbitraging opportunities and cash flow crises. To exploit a currency change or to avoid the latent risks of operating in volatile economies, smart manufacturers tend to operate and source (sometimes from the same suppliers) in several countries. By diverting the origin of their products, exposure to sudden changes is abated. Also, such manufacturers usually require their suppliers to provide upside production or supply flexibility. Indeed, it is usual for MNCs like Nike and Mattel to have facilities in the US, Mexico, China, Malaysia, Indonesia, Thailand, and India. When political volatility slows production in one country, volume can be moved to another. Thus, building a strong, flexible web of internal and external sources can hedge against the impact of currency and political barriers, and effectively mitigate supply risk.

Balance laws and regulations judiciously

Obviously, government regulation is a double-edged sword. It can either create or sustain a firm's exchange power advantage, or it can be used to constrain or remove such an advantage (Sanderson, 2001). When the government chooses to intervene, it must always adopt a careful balancing act. It must assess the costs to general consumer welfare of creative regulation on behalf of a particular firm(s). Also, it must evaluate the impact on innovation, growth, and employment of disruptive regulations to constrain or remove an exchange power advantage. Public sector agencies must then liaise with businesses and logistics service providers to cut a fine line between the two forms of regulations, so as to minimise disruption to the supply chain.

Rightly so, national borders are only translucent as they remain instruments of national government policy. Therefore, as goods and materials move across national frontiers, managing the customs function is a key factor to success within the efforts of supply chain management. In Europe, companies are already taking advantage of virtual bonded warehousing to speed-up customs clearance and reduce supply chain costs. Basically, companies can import goods into multiple points in the European Union and clear them at one port of entry. Participating companies must have a centralized inventory management system, which functions as the virtually bonded facility (Anon, 2001). Other benefits include flexible operations and distribution options, service improvements since goods are closer to their market, and less labour is required as clearance is needed at only one central point.

Invest in global information infrastructure

In addition, software solution providers active in the supply chain management space have developed a user friendly, web-based supply chain management service for the entire chain from purchase order to final delivery, including the export process and landed costs updating. The e-supply chain is clearly the trend and this global (due to the Internet) supply chain execution infrastructure can link everyone in the process i.e. buyers, carriers,

customs brokers, and financial providers (Sowinski, 2000). Through this, international barriers are conquered in cyberspace.

SMEs consortia to abate effects of barriers

Greater economies of scale can be achieved and the bottom-line significantly improved if SMEs can be clustered together as an economic grouping to rationalize their operations and achieve transportation scale economies and lower overheads arising from resource pooling.

5. Strategies employed by Singapore to overcome barriers

We now attempt to highlight how Singapore has, using a strategic interventionist approach through relevant public sector agencies, effectively embarked on assisting foreign MNCs and local SMEs to provide an environment conducive to the seamless flow of inventory, information and fast cash cycle times. Some of the proactive steps taken so far are provided below.

5.1 Supportive government policies

(a) Free trade culture

Singapore's free trade policy has been the cornerstone for its flourishing entrepot trade. Virtually all imports are duty-free. This result is credited to the tireless effort of policy makers who ensure that the right pro-business policies are in place for MNCs and SMEs. Foreign investors are not required to enter into joint ventures or cede management control to local interests. The government generally does not restrict nor discourage foreign investment either to protect local industries or for any other reason. Also, Singapore's strategy in addressing competitive challenges from the external environment is to increase productivity, upgrade labour skills, improve infrastructure capabilities, and to offer a wide array of incentives to attract higher value-added industries providing leading-edge technologies. This is consistent with Rumelt's (1987) creative regulation. Such efforts have realized favourable outcomes, namely, in creating employment and other allied service industry like logistics and supply chain services.

(b) Transparent investment stand and political stability

Investment policies are transparent and the government is viewed as clean, non-oppressive, and corruption free. It is one of the world's most open investment regimes, making the environment for business conducive (Table 1). Again, the government's philosophy is to maintain political stability for investors (the MNCs) and traders (promising local SMEs). This mindset is embodied in the government's dedication to free-market principles, and to maintaining a first-rate labour force and infrastructure to assist local players to join the global bandwagon.

Table 1: Business Environment in Asia Pacific

	Regional Ranking 1995-1999	Regional Ranking 2000-2004
Singapore	1	1
Hong Kong	2	2
Australia	4	3
Taiwan	5	4
New Zealand	3	5

Source: EIU May 2000.

(c) Government incentive schemes

These schemes mainly comprise a variety of tax concessions to encourage investment. Concessions such as the Expansion Incentive, Operations Headquarters, Export of Service and Authorised Trader schemes are often given to qualifying companies using Singapore as a logistics hub and for local enterprises to springboard into the region.

5.2 Trade facilitation

Singapore has no real non-tariff barriers to trade. The country's role as a regional commercial hub is underscored by the fact that 40 percent of Singapore's total imports are re-exported. According to the TDB, 90 percent of sea cargo (containerised and conventional) can be cleared by customs within 8 minutes while the same percentage of air cargo can be cleared within 14 minutes.

Another instrument used to digitize the paperwork that underpins the trade and logistics process is the TradeNet system. TradeNet allows companies to exchange business documents with government agencies, and local and overseas trading partners. Under TradeNet, a shipper or 3PL can submit electronic trade declarations to the TDB, Customs and Excise Department and various other controlling authorities for processing and approval. Approved documents are then sent electronically to the company’s computer for printing, usually within minutes, instead of the traditional hours and days. This effectively reduces cost and turnaround time for the preparation, transmission and processing of trade and customs declaration from port to dock. Today, over 2,600 TradeNet subscribers and more than half a million declarations are processed through the system each month. TradeNet.com, the Internet version, was established in 1998. Under this enhanced version, costs for users is further reduced. Already, registration fees have dropped to just S$50 instead of S$850 and the need for new users to install specialized software is removed.

The latest TradeNet Plus will be implemented by the end of 2001 to facilitate faster information flow through the entire trading chain, from product sourcing to delivery, further boosting logistics efficiency. The linkage between inventory and information flow is further enhanced through a number of schemes geared towards e-supply chain management. TradeNet Plus is expected to generate S$2.8 billion savings to the trading community. One feature of this enhancement is the Trade Finance System which allows shippers to submit online applications to participating banks for trade financing such as letters of credit, demand drafts and telegraphic transfers. It shortens the financial or cash to cycle time of the overall supply chain considerably.

5.3 Quality infrastructure

Singapore's seaport, airport and telecommunication infrastructure have attracted a large pool of MNCs and local companies. Supporting this hardware is a pool of qualified logistics professionals trained in specialised degrees or diplomas in logistics from universities and polytechnics, locally and abroad.

The emphasis on good infrastructure, knowledge or otherwise, appears to be a regular in the nation's development and upgrading plans. Singapore has a highly pro-business and modern infrastructure that rivals developed nations. The city-state also enjoys reliable and sophisticated networks for IT, telecommunications services, transportation and utilities. Singapore is ranked fourth (after the U.S., Sweden and Finland) as the most information-driven economy (Table 2). Net savvyness serves as a good leading indicator of e-distribution capabilities. Singapore's IT and telecommunications infrastructure is mature, with the phone-line penetration rate on par with developed nations (Table 3). To fuel the growth of information industries, Singapore has installed Singapore ONE, a nationwide high-speed fiber optic broadband network that provides multimedia applications and Internet services.

Table 2: World's Most Net Savvy Nation

	Internet Index Rank		**Overall Information Society Ranking**	
	1998	**1999**	**1998**	**1999**
Singapore	16	1	10	4
Australia	9	2	11	8
US	3	3	1	1
New Zealand	8	4	14	13
Sweden	2	5	2	2

Source: Information Data Corp Information Society Index 2000.

Table 3: Internet Penetration

	1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Hong Kong, China							
Internet Usership (number)	170,000	200,000	300,000	675,000	1,000,000	1,500,000	1,773,980
Number of Internet Hosts	12,437	17,693	49,162	67,914	83,000	99,600	na
Indonesia							
Internet Usership (number)	2,000	20,000	80,000	250,000	300,000	1,360,000	2,570,400
Number of Internet Hosts	177	2,351	9,591	9,603	15,448	22,399	na
Malaysia							
Internet Usership (number)	20,000	40,000	200,000	600,000	800,000	1,200,000	1,618,175
Number of Internet Hosts	1,606	4,194	25,200	32,269	47,852	57,422	na
Philippines							
Internet Usership (number)	4,000	20,000	40,000	100,000	150,000	380,000	532,000
Number of Internet Hosts	334	1,771	3,628	4,313	9,200	16,330	na
Singapore							
Internet Usership (number)	40,000	100,000	300,000	500,000	750,000	1,200,000	1,487,271
Number of Internet Hosts	5,252	22,769	28,892	57,605	67,100	73,810	na
South Korea							
Internet Usership (number)	138,000	366,000	731,000	1,634,000	3,103,000	10,126,000	13,259,072
Number of Internet Hosts	18,049	29,306	66,262	121,932	186,000	276,468	na

Taiwan							
Internet Usership (number)	180,000	250,000	603,000	1,500,000	3,011,000	4,790,000	4,934,344
Number of Internet Hosts	15,000	26,000	35,000	177,000	309,000	509,850	na
Thailand							
Internet Usership (number)	20,000	40,000	80,000	150,000	200,000	650,000	1,459,712
Number of Internet Hosts	1,728	4,055	9,245	14,378	20,527	28,860	na
Vietnam							
Internet Usership (number)	na	na	100	3,000	10,000	25,000	49,822
Number of Internet Hosts	na	na	5	5	34	34	na

Source: Euromonitor, 2001.

5.4 Good connectivity of transport modes

Singapore offers strong connectivity to the Asia-Pacific, being a vibrant international maritime center (currently ranked as the 11th most important maritime nation by UNCTAD). She is linked to more than 740 ports in 130 countries worldwide and acts as the focal point for over 400 shipping lines. When fully developed, Singapore's newest and most advanced Pasir Panjang Terminal will be able to handle 36 million TEUs a year. Singapore's air linkages are equally extensive, with 3,200 weekly scheduled flights served by 64 international airlines to 151 cities in 50 countries. Table 4 shows the extent of this connectivity.

Table 4: Air-sea Transport Connectivity to the World's Top 8 Regions

Region	Seaports	Daily Sailings	Airports	No. of weekly flights
Southeast and South Asia	44	22	31	1953*
Northeast Asia	29	9	17	893
West Asia	16	3	8	115#
Australia	19	1	22	415@
Africa	19	2	7	45
Europe (excl. Mediterranean)	24	5	31	421^
North America	22	3	18	212+
Central/South America	15	1	10	
Total	188	46	144	4054

Sources: Singapore Transport and Logistics, Jan 2000, p. 11; CAAS and PSA Corp.

* incl. India; # incl. UAE

@ this covers Oceania which includes Australia and NZ.

^ incl. Mediterranean; + incl. North, Central and South America

6. Key agencies involved in re-shaping external environment

In describing the strategies for overcoming the external barriers to SCM development for Singapore based firms, the effort of the public sector agencies have to be acknowledged. Without their active involvement, much of the accelerated growth and maturity of the logistics industry would still be a moot point. We now briefly mention the roles and functions of the TDB, EDB and PSB.

6.1 Role and functions of the TDB

The TDB is the national trade promotion agency to help the private sector promote and facilitate trade. One of the major thrusts of the Trade21 blueprint is to make Singapore the global center for trade hub services, including logistics. To achieve this objective, the TDB has adopted a three-pronged approach, namely,

(i) Administering tax incentives and programs to persuade MNCs to set up RHQs locally
(ii) Providing local businesses with timely market intelligence and project development support
(iii) Ensuring efficient trade support services through TradeNet.

The TDB plays a pivotal role in helping to position Singapore as a total logistics hub, with leading edge capabilities in terminal facilities and logistics management competency. In this regard, the TDB has identified, as part of the Logistics Masterplan, six key thrusts to advance the logistics industry in the new millennium (TDB Press Release, 1999). The strategies to drive this set of thrusts are as follows:

1. Develop an integrated and globally connected infrastructure.
2. Develop a conducive IT based environment and competent IT capabilities.
3. Enhance integrated logistics operations.
4. Attract international global hub activities and solutions based services and internationalise the local logistics industry.
5. Develop world class expertise and skills.
6. Enhance market access to facilitate expansion of international networks.

Apart from formulating relevant logistics and trade policies, the TDB is also active in creating greater market access through organizing logistics missions to key and emerging markets to enhance the global reach of local logistics firms and better understand the host environment. For the smaller firms that risk being marginalized by mega mergers and alliances, the TDB is currently working on how to band these companies together into sufficiently large consortia to help them regionalize.

The TDB is also working closely with the Manpower Ministry to formulate a Logistics Manpower Roadmap to develop requisite manpower capabilities, particularly those of the professionals and managers. One scheme is the Certified Practising Logistician (CPL). Launched in March 2000, this scheme recognizes and qualifies professional logisticians, and improves the technical, managerial and logistics-specific competencies of the middle managers and specialists. In this effort to professionalise the logistics industry, the TDB is coordinating with industry associations and other relevant education and training institutions to develop the CPL program. It is part of an overall plan to develop a critical mass of logisticians to propel the industry towards e-logistics (TDB Press Release, 2000b).

6.2 Role and functions of the EDB

Another government agency instrumental in promoting the growth of the logistics industry is the EDB. The vision of the EDB, based on the Industry 21 vision, is to develop Singapore into a leading integrated logistics hub in Asia by the year 2010. As such, the EDB is promoting and developing the full range of logistics capabilities to support

manufacturing and business services, through 3PLs, chemical logistics companies and electronic components integrators.

The EDB screens investment proposals to determine their eligibility for various incentive schemes and to provide assistance where possible. While those investments that do not meet the criteria are not given incentives, they are not prohibited from proceeding. As a one-stop service that helps foreign investors avoid red tape, the EDB is known for being responsive to changing business conditions and investor needs. In this regard, new policies are constantly being introduced, for example, the manufacturing headquarter scheme, to deliberately woo select clusters of manufacturing based MNCs to site their global manufacturing base in Singapore.

One recent fruition of this effort is the creation of the Airport Logistics Park of Singapore (ALPS) to service the S$12 billion a year air logistics industry. Strategically located next to the international airport within a free trade zone, spread over 26 hectares of land, the $35 million ALPS is an infrastructure development to allow transshipments to undergo rapid modification and be flown to any of the world's markets, without leaving the free trade zone. This is a significant advantage to the 3PLs and contract manufacturers, not to mention the indirect savings arising from duties, documentation, customs clearance and transportation. The projected savings in the total cycle time is as much as 4-6 hours, which is significant considering the average turnaround time of less 24 hours for this industry.

6.3 Role and functions of the PSB

The PSB works closely with the other agencies to enhance local SMEs' competitiveness and economic growth. In this regard, the PSB works with the industry associations to help develop industry wide applications aimed at transforming business and help SMEs form economic groupings for better synergy and economies of scale. Managing more than 60 development assistance programs and 56 economic groupings in 33 trades, this agency is critical in helping SMEs overcome various external barriers.

As for SCM performance and networking, the PSB launched the BusinessConnect Program in 1997 to enable SMEs to seek new business opportunities outside of Singapore and to explore the feasibility of business alliances with foreign partners. Under the program, business-matching events are organised either in Singapore or in Singapore's major export markets. At these events, participating local and foreign enterprises hold pre-arranged meetings on the basis of their business interests and objectives. Overall, the BusinessConnect program has facilitated about 4,000 business meetings for some 5,800 companies. Complementing this program is SingaporeConnect, a global business matching service on the Internet. SingaporeConnect has attracted an average of 120 business collaboration interests posted each week and the website has been accessed more than eight million times since its launch in 1997.

Another program launched in 1997 is the National Cost of Quality (NCOQ) program. The aim is to help SMEs set up cost management systems to increase their cost competitiveness and enhance profits. With a cost of quality system in place, the SME is able to determine the extent of its actual and potential quality problems, quantify visible and hidden costs, and identify and prioritise areas for optimal SCM improvement. In

short, a COQ system helps SMEs to minimise costs by eliminating inefficiencies, reducing wastage, saving energy, recycling materials and improving logistics processes. Such tangible results lead to productivity gains, superior performance and greater profitability. Since then, more than 500 SMEs have embarked on the NCOQ program. PSB has reported that the first 80 SMEs who completed the program have realized annual cost savings of S$23 million, or on average about S$288,000 per participating SME. Through this program, SMEs can enhance their inventory management control, improve on order picking efficiency and purchase planning systems.

On the aspect of pooling of resources, the PSB has also instituted the Business Fusion Program. The objective is to help SMEs of related industries or in the same value chain to come together to exchange information, share resources and enhance mutual co-operation. SMEs under this program can thus better compete by leveraging on each other's resources and expertise. By pulling resources together, they are now in a stronger position to venture into new markets and overcome cross border impediments. Since the launch of the program in 2000, more than 200 SMEs have registered with PSB. Of these, 97 have formed 30 fusion groups in industries such as automotive services and repairs, industrial tool calibration, logistics, construction, silk screen printing, medical instrumentation and transportation.

The PSB has also been encouraging local SMEs to leverage on Internet technology to sharpen their competitive edge. Under the SME 21 Plan launched in January 2000, one of the goals is to increase the number of SMEs using e-commerce to 32,000 by 2003 so that at least one in three SMEs are connected to the world economy. To achieve this goal, the PSB has drawn up an e-commerce adoption action plan to encourage SMEs to jumpstart their online capabilities by using ready-made packages offered by e-commerce service providers. Currently, about 17,000 SMEs are involved. The PSB works closely with the industry and key portal operators to customise applications to suit the needs of SMEs in different trades to build sizable online trading communities for e-commerce services such as B2B, B2C portals or application service providers. A PSB survey found that almost 50% of the SMEs with e-commerce capabilities have made some online transactions, and close to 60% of the SMEs still perceive that the Internet can enhance their business efficiency and growth. As they embrace e-commerce in their business operations, these SMEs will transform into vibrant and resilient enterprises that can compete effectively in the region.

7. Concluding remarks

In view of globalization and the impending one marketplace, good supply chain management is here to stay. However, before any enterprise can realize the benefits of improved logistics or commercial success, the barriers, internal and external, must either be overcome or mitigated. External barriers such as IT and business infrastructure, unenlightened trading environment, low skills level of the workforce, weak political and economic policies, and inefficient trade facilitation systems must be tackled and managed positively by the relevant agencies working closely with the movers and recipients of logistics. Only then, can businesses, particularly SMEs, achieve an operating capability within a sophisticated infrastructure that includes excellent free trade zone facilities, ports providing speedy goods transfer or handling for redistribution, efficient warehouses and

excellent telecommunications. To remove the external barriers, collective effort is required.

For SMEs especially, public sector help through the provision of adequate physical and virtual infrastructure is required in order to provide the necessary conduit for moving effectively along the global or regional supply chain. This paper has highlighted the example of Singapore's attempt to do so. Government and her related instruments must play an active role in fostering such conducive environments, engage in confidence building, and remove arcane bureaucracy.

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Profile

Dr. Bremer is an economist and policy analyst with more than 25 years of experience in international trade and development. Her career focuses on expanding U.S. business opportunities in developing countries and bringing private sector resources to bear on development challenges. Dr. Bremer currently serves as Director of the Kenan Institute in Washington, the Washington, DC branch of the Kenan Institute of Private Enterprise, an independent institute within the Kenan-Flagler Business School of the University of North Carolina at Chapel Hill. In this role, she is responsible for conceptualizing and implementing innovative programs to promote development cooperation between U.S. companies and partners in emerging market countries. She also supervises ongoing institute projects in Thailand, Egypt, Vietnam, and elsewhere, including the U.S. Secretariat of the U.S.-Thailand Development Partnership, a program of technical and economic cooperation with Thailand designed to succeed U.S. bilateral foreign assistance in that country. She directs Kenan's participation in the UNC Center for International Business Education and Research (CIBER), focusing on corporate social responsibility, corporate-NGO cooperation, and managing globalization. Dr. Bremer has directed a wide range of academic and applied studies, both in the United States and overseas, focusing on trade promotion, corporate social responsibility, development programming, and policy issues. Her extensive international experience includes long-term assignments in Egypt and Mexico and more than 40 short-term assignments in 32 countries, emphasizing policy reform, international trade, and private enterprise promotion.

Name: Krizz Chantjiraporn

Position: Director, EAN Thailand Institute

Contact Info: The Federation of Thai Industries (FTI)
Queen Sirikit's National Convention
60 New Ratchadapisek Rd.
Bangkok, Thailand 10110
Tel: 229-4255 x 219
krizzc@fti.or.th

Education:

1999	Diploma in Management Consulting & Change Programme Hong Kong University, PKKI
1998	Master of Arts in Business Communication and Management The University of the Thai Chamber of Commerce (UTCC)
1994	Master of Management, Sasin Graduate Institute of Business Administration (GIBA)
1976	BSc Management, Southeast Asia Union College, Singapore - Affiliate of Andrews University, USA

Profile:

Present	Director & Principal SCM Consultant, EAN Thailand Institute, The Federation of Thai Industries (FTI) • SCM Executive Education Center • E-Business Education Center • Global Standard ADC & EDI Advisory Center
Present	Secretariat, Thailand ECR Board
Present	Member of Global Logistics Initiatives (GLI) EAN International (Brussels) and Uniform Code Council (Princeton)
Present	Supply Chain Principal Consultant Supply Chain Resource Centre, Hongkong Article Numbering Association
Present	Chairman, EDI Purchasing Wkg Grp (Th PWG), TEDIC, NECTEC Principal Consultant, SCM Consultant Ltd. Supply Chain Consultant, HKANA, Hong Kong GM & Project Manager, Overseas Credit Card Phone Project at ATT MD, Build New Glass Plant, Setup & Operate, Lucky Glass Exec. Logistics Manager, Diethelm Consumers Products Sr. Materials & MIS Manager, Data General Thailand Ltd. Purchasing, MIS & Export Mgr., Thai Toshiba Electric Industries Ltd. UN Training Expert in Export, Inter Trade Centre, UNCTAD, GATT

Krizz is a certified management consultant. He trains and consults widely both in Hong Kong and Thailand in logistics and supply chain management. He is the principal consultant at EAN Institute Thailand.

Name: Mark Goh

Position: Deputy Director, e-Business Centre

Contact Info: Prof Mark Goh
NUS Business School
15 Law Link
National University of Singapore
Singapore 117591
e-mail: mark_goh@nus.edu.sg
Tel: 65-8743014
Fax: 65-7792621

Education: 1984 BS in Mathematics
1987 PhD in Applied Mathematics
1993 MBA

Profile:
1989 - now Teaching staff, NUS
1991 Lecturer at GSM, Adelaide University, University of South Australia
Served as Associate Director TLI-AP
Served as Director of Penn State-NUS Logistics Management Program
Served as V-P of Operations Research Society (Singapore), Australian Alumni (Singapore)
2000- now Associate Senior Fellow at Institute of Southeast Asian Studies Consul
1997-now Director (Education) Chartered Institute of Transport and Logistics (Singapore)
Consulted for organizations such as Verity Perkins, Applied Bio-Systems, Danzas-AEI, Bossard, HP, Siemens Nixdorf, Unilever, TDB, Lucent, Fuji-Xerox.

Publications: Has published widely in areas related to supply chain management and logistics.

Name: Satoshi Kuroiwa

Position: Project General Manager of IT & Telecom Business Division
Toyota Motor Corporation

Contact Info: 4-18 Kouraku 1-Chome
Bunkyo-ku, Tokyo,
112-8701 Japan
e-mail: skuro@mail.toyota.co.jp

Education: 1969 MS in Electric & Control Engineering

Profile:

2000-2001	Chairperson of Planning committee Electronic Commerce Promotion Council of Japan (ECOM)
2000	Invited Researcher of Nagoya University (Electronic Commerce)
2000	Lecturer of Nanzan University (Management Information)
1999	Lecturer of Aichi University (Management Information)
1985-1996	Planning and Development of Information Enhance Production System and Logistics

Name: Steven Pereira

Position: General Manager E Commerce Development

Contact Info: EAN Australia
2 Kingston Town Close
Oakleigh, Victoria 3166
Australia
Tel: 61 3 9569 9755
Fax: 61 3 9569 1525
Email: spereira@ean.com.au

Education: 1979 Bachelor of Commerce Degree from University of Western Australia

Profile: Held a number of management positions within EAN Australia since August 1996. Was GM Membership Services between 1999-2000.

Chair of the Australian Retail Industry EC Standards Working Group since 1997 and participates in a number of other industry working groups, including Textiles Footwear and Clothing, Health and Hardware.

Steven is also a member of the Australian CEFACT Management Committee, which is the Australian entry point to the United Nations body for trade facilitation and electronic business (UN/CEFACT).

Steven is also a member of EAN International's Electronic Commerce Expert Group, which is involved in the development of EAN.UCC standards in e-messaging, including EDI and XML.

Between 1980 and 1996 Steven held a number of positions with Australia's largest retailer, Coles Myer Ltd, and was involved in distribution centre operations, logistics, distribution systems development, EDI implementation and in finance and administration.

Name: **Carol A. Ptak, CFPIM, CIRM, Jonah, PMP**

Position: **Global SMB Solutions Segment Executive**

Contact Info: **IBM Corporation**
PO Box 178
Lakebay, WA 98349, USA
Email: cptak@us.ibm.com

Education:
2001, Project Management Professional, PMI
1998, Jonah, Goldratt Institute
1990, Effective Management of Production Operations (EMPO), Stanford University
1988, Masters, Business Administration (MBA), Rochester Institute of Technology, Manufacturing and Materials Management major, Economics minor
198x APICS Certifications in Production and Inventory Management (CFPIM) (fellow level) and Integrated Resource Management (CIRM)
1978, Bachelors Degree (BA), State University of New York at Buffalo, Biology major, Mathematics and Computer Science minor

Profile:

IBM Corporation, (8/98 – present)

Global SMB Solutions Segment Executive, 7/01 – present
Responsible for worldwide ERP strategy for small and medium sized business

Program Director, Mid-market solutions, 7/00 – 7/01
Global marketing position responsible for mid-market solutions in the area of ERP, Supply Chain Management and e-commerce leveraging the IBM brand. Achieved Excellence Award (Oct 2000) for project management mid-market solutions.

Worldwide ERP/SCM Solutions Group Executive, 8/98 – 7/00
As part of an executive sales team, provide resources and creative solutions for manufacturing enterprises facing challenges in integrated resource management including supply chain and ERP. Participate as part of the customer project steering committee.

Eagle Enterprises, (2/93 – 8/98) Owner
Consulting for enterprise excellence through education followed by successful implementation. Projects included system selection, resource management education and ERP implementation support.

Heath Tecna Aerospace (Now Hexcel Corporation), 3/89 - 2/93

Operations Manager, Kent Stowbin Group, 8/90 - 2/93

Production Control Manager, Kent Structures, 3/89 - 8/90

Bausch and Lomb Inc., 9/87 - 12/88

Manager, Materials and Data Control, Professional Products Division, Clinical Research Services, 1/88 - 12/88

Distribution Manager, Optical Systems Division, 9/87 - 1/88

Sybron Corporation/MDT Corporation, 4/83 - 9/87

Materials & Production Manager, Clinical Technology Division, 12/86 - 9/87

Supervisor, Materials and Traffic, Clinical Technology Division, 3/85 - 12/86

Production & Inventory Control Specialist, Clinical Technology Division, 3/84 - 3/85

Microbiological Laboratory Technician, Castle, 3/83 - 3/84

Academic Instruction

Graduate School seminar in Operations Management, Pacific Lutheran University (PLU), 48 contact hours, Summer 1993, 1994, 1995, 1996, 1997

Graduate Business School Project Management class, 24 contact hours Pacific Lutheran University January 1994, 1996, 1997, 1998

Manufacturing Strategy and Tactics, Rochester Institute of Technology, 44 contact hours, undergraduate course, Spring 1989

PUBLICATIONS – Books and published papers

Necessary but not Sufficient, with Eli Goldratt & Eli Schragenheim, North River Press, 2000

ERP, Tools, Techniques and Applications for Integrating the Supply Chain, St. Lucy Press, 1999

MRP and Beyond - A toolbox for integrating people and systems, Irwin Publishing ISBN 0-7863-0554-1

Various articles for software company magazines such as QAD and Silvon

“ERM Checklist”, APICS Performance Advantage, June 1998

“Now Hear This! ERP for Small Business”, APICS Small Manufacturing SIG Newsletter, January 1997.

"Continuous Improvement-Where's the Target? or "Get Those Gremlins!"", APICS Small Manufacturing SIG Newsletter, Third quarter 1994.

"Customer Focus", APICS Small Manufacturing SIG Newsletter, Fourth quarter 1993.

"Improvement Activities-What's the Goal?", APICS Small Manufacturing SIG Newsletter, Third quarter 1993.

"MRP, MRP II, OPT, JIT, and CIM: Succession, Evolution or Necessary Combination?" Production and Inventory Management Journal, 2nd qtr 1991

"A Comparison of Inventory Models and Carrying Costs", Production and Inventory Management Journal, 4th qtr 1988

Name: Richard Shieh

Position: General Manager of Professional Services Group, Compaq Computer Taiwan Limited.

Specialty: Business Transformation/BPR, Information Technology Strategic Planning, IT package(ERP, EC,..) implementation

Education: Master, Computer Science, Gorge Washington University, U.S.A
Master, Business Administration, National Taiwan University, Taiwan

Profile: Richard Shieh, General Manager of Professional Services Group in Compaq Computer Taiwan Limited, is in charge of the Professional Services (PS) business in Taiwan and Manufacturing Industry business in Mainland China. No matter on Computer Integration Manufacturing, Telecommunication Industry Services, Next Generation Infrastructure, e-Commerce and Knowledge management or e-Application Practice departments, Richard always leads the Professional Services Group to set the best record in that field. Richard and his marvelous group contribute to the success of Compaq Professional Services.

Mr. Shieh has pilot TaiWeb - the largest Supply Chain management project in Asia. The project has helped Compaq to build global logistics management system to manage the US$9.7 Billion procurement in Taiwan in 2000. This e-Commerce's integrating, collaboration solution activated the upstream, midstream and downstream suppliers' processing system in the whole country.

Prior to join Compaq, Richard was in the position of deputy GM of Oracle Taiwan , responsible for the Oracle Consulting services business including business development and services delivery. During the three and half years in his service, the Oracle consulting services had helped construct more than 60 ERP systems in Taiwan. After assisting many enterprises to re-engineer their business process, strengthen enterprises' competitiveness, not only he personally received much compliment, but also the Oracle's consulting service business grew 700% in 42 months.

For devoted himself in popularizing technology optimization, Richard is usually invited by industry to share his personal experience in this field. "Strategy Innovation in new Economic Era", "SCM in eBusiness", "Competitive Advantages of IT", "BPR enabled by ERP" and "Deployment and Benefits of Virtual Fab", ….. are all topics he used to address.

Mr. Shieh's former positions are Deputy General manager of consulting service in Oracle; Business Transformation consultant, Sales manager in IBM in charge of Business transformation, software development. Sales manager and Technical in Janus Computer Inc.

Name Dr. Supriya Sithikong

Education

1977	B.Sc. (Eng.) in chemical engineering University of London (Imperial College), United Kingdom
1981	Ph.D. in chemical engineering University of London (Imperial College), United Kingdom

Current Work Position Director, Bureau of Industrial Promotion Policy & Planning

Work Address Department of Industrial Promotion (DIP), Ministry of Industry
Rama 6 Road, Rajthevi District, Bangkok 10400,Thailand
Tel. (66-2) 202 4455, 245 6775 Fax. (66-2) 246 5602

Previous Positions / Work Experience

2000-Present	Director, Bureau of Industrial Promotion Policy & Planning, DIP
1998-2000	Director, Industrial Development Policy Division Bureau of Industrial Promotion Policy & Planning, DIP
1996-98	Director, Agro-Industry Division Bureau of Industrial Sectors Development, DIP
1993-96	Chief, Agro-Industry Promotion Centre Industrial Service Division, DIP
1991-93	Chief, Miscellaneous Industries Sub-Division Industrial Service Division, DIP
1990-91	Head, Development Projects Section Planning Division, DIP
1986-90	Head, Industrial Studies Section Planning Division, DIP
1985-86	Industrial Technologist, Industrial Development Centre Planning Division, DIP
1984-85	Head, Ceramics Section Cottage Industry Division, DIP
1982-84	Head, Kiln & Furnace Section Cottage Industry Division, DIP
1981-82	Engineer, Process Development Section Cottage Industry Division, DIP

Other Duties / Experience

1999-2000	Assistant Secretary, Sub-Committee On Thai Railway Restructuring
1998-2000	Assistant Secretary, Sub-Committee On Implementation Of Industrial Restructuring Programs National Committee for Industrial Development
1996-98	Assistant Secretary, Industrial Restructuring Planning Sub-Committee National Committee for Industrial Development
1983-97	Member of several working groups on manpower planning, organizational restructuring, and performance measurement of DIP
1982-90	External Lecturer, Chemical Engineering Masters Program King Mongkut's Institute of Technology Thonburi

Current Project Under Supervision

1999-Present	Formulation of Master Plan for SME Development Formulation of Action Plan for SME Development

Participation in Foreign Assistance Projects

1999-Present	Chief Expert Survey on Role and Adaption of SMEs in the Changing Industrial Structure (Asian Productivity Organization – APO)
1994-6	Project Manager Small-scale Agro-Industry Development Project (Germany)
1989	Counterpart Officer Formulation of a National Program for the Development of Small-scale Industries in Thailand (EC / Ireland)
1985-86	Project team member Small Industry Development Project (Germany / Ireland)

Short Training & Seminars

1996	Organizational Effectiveness, (APO / Hong Kong)
1996	Middle Management Pre-Requisites (DIP)
1995	Promoting Agribusiness for Higher Productivity (APO / Indonesia)
1992	Plant Layout and Materials Handling (APO / Taiwan)
1988	Small Industries Development (APO / Taiwan)
1986	Small Enterprise Development (ILO / Italy)
1986	Small Industry Development (Germany / Ireland)

Name: Barbara L. Tresselt

Position: Manager, Merchandising and Operational Process Development
Target Corporation

Contact Info: Target Corporation
33 South Sixth Street, CC-46S
Minneapolis, Minnesota 55402
Ph 612-304-4657 Fax 612-304-3355
email: Barbara.tresselt@target.com

Education: 1978 BA Merchandising;
American College of Merchandising-Switzerland
1979 BS Clothing, Textiles & Design; Merchandising &
Business Administration
University of Wisconsin-Stout USA

Profile: 1979-1983: Manager; Big Ticket- Dayton's Department Store
1983-1985: Manager; Ladies Sportswear- Donaldson's Department Store
1985-1987: Buyer; Junior Sportswear- Donaldson's Department Store

1987-1992: Manager Merchandising Planning and Control- Target Stores
Executed planning and allocation of $120 million dollar business:
Ladies Woven and Knit Bottoms, Ladies Active Sportswear and Ladies Denim-
Target Stores total chain.

1992-1999: Sr. Business User Consultant Software Systems Development-
Target Corporation
Defined business processes and user requirements for software systems development for the following Target Corporation Merchandising Systems: Vendor Database, Vendor Compliance and Reporting, Product Development Specification, Partnership Performance Measures

1999-2000: Supervisor Global Merchandise Systems- Target Corporation
Supervised Client Systems Support Group for Global Merchandising Systems. Staff supports 38 software applications for Merchandising Buying areas.

2000-Present: Manager Merchandising Operations and Process Development-
Target Corporation- AMC
Manages all business aspects of system development with regard to Target Corporation and AMC. Define and develop consistent common processes across all Target Corporation Companies for both Import and Domestic businesses.

Name: Michael Anthony Yee

Position: Chief Information Officer, Department of Information Technology

Contact Info: Esquel Enterprises Limited
12/F, Harbour Centre, 25 Harbour Road
Wanchai, Hong Kong
Tel: (852) 2960 6626
E-mail: yeemi@esquel.com

Education:

1992 Qualified Canadian Chartered Accountant (C.A.)
1988 BS in Computer Science from the University of British Columbia

Profile:

2000 - Current

Esquel Enterprises Limited, Chief Information Officer
Project Manager for eSCM project for the Esquel Group.
This is a company wide project that utilizes technology and the re-engineering of processes to integrate and synchronize the supply chain within Esquel's integrated supply chain as well as outside suppliers.

1998 – 2000

Kurt Salmon Associates, , Director – Greater China
Responsible for the marketing and management of the newly launch KSA I.T. practice in Eastern Asia (all of Asia except Japan) as well as daily management of key strategic accounts.

1996 – 1998

Upsilon International Ltd., Director
Started firm with the objective of providing I.T. software tools and consulting to multinational companies in Greater China.

1994 – 1996

Deloitte Touch Consulting (Hong Kong), Manager
Part of the Canadian team that setup the Hong Kong / Canadian management consulting joint venture practice. My primarily responsibility was assisting the setup of the I.T. practice in Hong Kong.

1992 – 1994

Deloitte Touche Tohmatsu (Toronto), Corporate Restructuring Division, Manager
Responsible for business restructuring and turn around for several debt-stricken business. My responsibility included day-to-day management of the business until it turns profitable and can be disposed at the highest value.

Available Profiles of Delegates Authors/Speakers (by economy)

Australia	Simon Damien Stratton
Brunei Darussalam	Aisah Othman
Brunei Darussalam	Maidin Tinggal
Canada	Dr. Darren B.G. Meister
Hong Kong, China	Anna Lin
Hong Kong, China	Dr. Victor Hing Yau Lo
Japan	Takeshi Satow
Korea	Kyung-Eui Hong
Korea	Dr. Chun Keun Kim
Russia	Anton Vladimir Panfilov
Singapore	Chiew Pung Chan
Singapore	Cynthia Ng Hwei Hoon
Chinese Taipei	Dr. Anthony Fu-Wha Han
United States	Don Williams
Vietnam	Nguyen Quang Dung
Vietnam	Tran Quoc Trung

Australia -Resume of Delegate

Name: Simon Stratton

Position: Policy Officer, Department of Transport and Regional Services

Contact Info: GPO Box 594
CANBERA ACT 2601
AUSTRALIA
61 2 6274 7845 (work)
Email: Simon.Stratton@dotrs.gov.au

Education: 1996-01 PhD. in progress University of Adelaide
Working title: 'Industrial relations in the port of Durban'
1999 Grad. Cert. Public Administration - University of Canberra
1996 Grad. Dip. Labour Studies - University of Adelaide
1994 BA (Honours) Politics - Flinders University
1992 BA - Flinders University

Profile:

1998-2001 Policy Officer with the Transport Logistics and International Trade and Services teams of the Cross-Modal and Maritime Transport Division, Australian Department of Transport and Regional Services. Developing recommendations for reforming education and training institutions in relation to supply chain management and logistics skills. Project development for Australian initiatives within the APEC Transportation Working Group, specifically in relation to the Intermodal Task Force, Port Experts Group and Maritime Initiative.

1995-97 University of Adelaide – Centre for Labour Studies researcher

1993-94 Department of Employment, Technical and Further Education, South Australia. Project Officer - Youth employment strategy

Brunei Darussalam - Resume of Delegate

Name: Ms. Aisah Othman

Position: Assistant Supplies Manager

Contact Info: Supplies, Engineering Department
Royal Brunei Airlines
PO Box 737
Bandar Seri Begawan BS8671
Brunei Darussalam
e-mail: esaisaho@rba.com.bn
website: www.bruneiair.com

Education: 1995/96 (MBA Based) MSc Project Management,
Cranfield School of Management, Cranfield University, UK

1987-1990 BEng Electrical & Electronic Engineering,
Staffordshire Polytechnic, UK

Profile: 1998 to Date – Asst. Supplies Manager, RBA

- Lead a team of 47 staff comprising of Purchasers, Dispatchers, Goods Receiving & Inspectors, Storekeepers, Inventory Auditors and Engineering Finance Officers.
- Enhanced Supply Chain Management practices.
- Accomplished Re-engineering for best practice of Material Management.
- Developed Partnerships with SMEs.
- Acceded the use of e-commerce.

1997 – Executive Officer, RBA

– Performed Capital Project Appraisals, Performance and Financial Analysis.
– Provided In-house Consultancy Services and Managed Several RBA Projects.

1995 to 1996 – MSc Project Management

- Mastering in Supply Chain Management Theories and Practices.

1990 to 1995 – Engineer, Department of Electrical Services

- Managed Projects and Administered the Tenders and Contracts.
- Designed and Implemented On-line Projects Monitoring System.

Brunei Darussalam - Resume of Delegate

Name: Maidin Tinggal

Position: Materials Management Advisor, Brunei Shell Petroleum

Contact Info: E-mail: masdin@brunet.bn

Education: Diploma in Chartered Institute of Marketing [U.K.]
Diploma in Chartered Institute of Purchasings and Supply [U.K.]

Profile:

Royal Brunei Airlines 1979 – 1982
Job Title: Marketing officer
Responsibilities:
Developed marketing plan & strategy, dealt with advertising company, the media, sales outlets, liaised with sales & reservation departments and handled promotional campaign materials.

Champion Motor [Inchcape Group] 1982 – 1984
Job Title: Branch Manager
Responsibilities:
Managed the branch, sales, stock, workshop, marketing and PR with Government department, handled tender. Managed HR and account.

Own Business 1984
Business type: Freight Forwarding

BSP 1985 – now, refer to the attached list.
Current job: Materials Management Adviser – FCP/5

Group Experience

Date from-to	Company/Dept.	Job title and short contents
02/01/1985-1987	BSP/SSU	Trainee/Head of Movables [SSU/3]
1987-1990	SIPM, Holland	MAIP/112 [Buyer]
1990-1992	BSP/SSU	SSU/12 Head of General Materials Buying Section
1992-1993	BSP/SSU	SSU/14 Head of Project Section
1993-1995	BLNG/LFA	LFA/1 Head of Supplies & Materials Division
1995- 2001	BSP/SSU	SSU/1 Head of Procurement
2001 - Now	BSP/FCP	Materials Management Advisor

Canada - Resume of Delegate

Name: Darren Meister

Position: Assistant Professor, Queen's School of Business,
Queen's University, Kingston, Ontario

Contact Info: Telephone: 613 533 6980
Fax: 613 533 2325
E-mail: dmeister@business.queensu.ca

Education:

1991-93	**Department of Management Sciences, University of Waterloo, Ontario** *Doctor of Philosophy* (Information Systems and Operations Research).
1989-90	**Department of Systems Design Engineering, University of Waterloo, Ontario** *Masters of Applied Science* (Applied Game Theory)
1988-89	**Computer Laboratory, University of Cambridge, Cambridge, England** *Post-Graduate Diploma in Computer Science*.
1983-88	**Department of Systems Design Engineering, University of Waterloo, Ontario** *Bachelor of Applied Sciences* (option in Management Sciences)

Profile:

Academic Appointments

1997-	**Queen's University, Kingston, Ontario** *Assistant Professor*
1995-97	**Carleton University, Ottawa, Ontario** *Assistant Professor*
1993-95	**Carleton University, Ottawa, Ontario** *Post-Doctoral Fellow*

Research and Consulting Interests

1. Manufacturing related B2B relationships including design and manufacturing collaboration, assessment of organizational readiness, adoption of e-commerce related practices by individuals

2. Knowledge management in professional organizations

3. Adoption of technology in professional organizations

Selected Recent Publications and Papers Related to Conference

Meister, D. (2000) Manufacturing Connectedness: Challenges and Opportunities, forthcoming chapter, M. Warkentin (Ed.), B2B Ecommerce

Gerwin, D. and D.B. Meister (2000) Coordinating New Product Development in an International Joint Venture, to appear in International Journal of Technology Management

Meister, D.B. (2000) Characteristics of Firms with Electronic Collaboration Experience: A Survey of Canadian Manufacturing, *Workshop on Information Technology and Systems*, Brisbane, Australia

Meister, D.B. (2000) Assessing an Organization's Preparedness for the Virtual Enterprise**:** The TEMPLET Model, *Proceedings of the 33rd Hawaii International Conference on System Sciences,* Oahu, Hawaii

Meister, D.B. (2000) "Steps Towards Manufacturing Connectedness: Common Concerns And Useful Actions", report prepared for Industry Canada

Meister, D.B. (1999) "Connectedness in Manufacturing: Results of a Survey on Standards Adoption in Canada", report prepared for Industry Canada

Hong Kong, China - Resume of Delegate

Name: Anna Lin

Position: Chief Executive, Hong Kong Article Numbering Association

Contact Info: Hong Kong Article Numbering Association
Unit B, 22/F
95 Queensway
Hong Kong
Email: annalin@hkana.org

Education: MBA degree in Strategic Management from the Birmingham University at UK.

Profile: Ms Anna Lin joined the Hong Kong Article Numbering Association in 1989.

As Chief Executive of the Hong Kong Article Numbering Association, Ms Lin's responsibilities include overall management and development of the Association whose role is to advise and support Hong Kong industries on the use of international EAN.UCC standards and technologies such as identification numbers, bar coding and EDI for Supply Chain Management. HKANA is a member of EAN International representing in 128 economies/countries with nearly 900,000 corporate users worldwide.

Ms Lin is represented at numerous international and local committees including EAN International Global Marketing Committee (1998-1999), ECR Asia Council, ISO/SC31 on Automatic Data Capture, Hong Kong Information Infrastructure Advisory Committee Task Force (1997), Hong Kong Employees Retraining Board Computer Networking System Committee, Steering Committee of The University of Hong Kong Authorized Academic Java Campus and Technology Centre for Electronic Commerce Standardization.

Before joining the HKANA, Ms Lin worked for a UK-based HK apparel group where she held the position of Business Planning Manager with responsibility for management information and planning.

Hong Kong, China - Resume of Delegate

Name: Victor H Y Lo

Position: Chairman, Manufacturing and Industrial Engineering Division, Hong Kong Institution of Engineers

Contact Info: Room 8-8, Haking Wong Building, Industrial and Manufacturing System Engineering Department, University of Hong Kong, Pokfulam Road, Hong Kong
E-mail: vhylo@hkucc.hku.hk

Education: BEng CNAA, U.K.,
MSc, University of Hong Kong,
Eng D, Warwick University, UK,

Profile: Dr. Lo is an industrial management specialist who has years of experience in both manufacturing and service sectors. Apart from general topics such as "Supply Chain Management, Customer Services, Strategic Management, Statistical Quality Control, ISO 9000 / ISO 14000, Business Process Re-engineering, Total Quality Management, Just-in-time and the Japanese 5S, etc.', Victor has special research interest on industrial development in PRC and the adopting of Chinese culture and philosophies in modern quality management. Victor is a Chartered Engineer, a Fellow of the HKIE, a member of the Institute of Quality Assurance, and is the Chairman of the Manufacturing and Industrial Engineering Division (96-98)(00-02), as well as a Council Member (97-98) of the Hong Kong Institution of Engineers. Victor is currently the Chairman of the Certification Advisory Council of the British Standards Institution (BSI) Pacific. A Technical Expert - British Standards Institution (BSI) Pacific. A Technical Expert, Hong Kong Accreditation Service (HKAS), Innovation and Technology Commission. The assessor for The 9th Hong Kong Quality Management Convention Awards, 2001, and the Judging Panel Member, of the Hong Kong Industry Award: Quality, Trade and Industry Department, HKSAR.

Japan -Resume of Delegate

Name: Takeshi Satow

Position: Associate Professor

Contact info: Nagano University
658 –1 Simonogou
Ueda City
Nagano Prefecture
Japan
. E-mail: t-sato@nagano.ac.jp

Education:
1982 BS in Social Sciences
1984 MS in Political Sciences
2001 Candidate of PhD in Management

Profile:
1986 - 1993 Senior Researcher , Distribution Policy Institution
1993 - 1997 Assistant Professor, Nagano University
1997 - Associate Professor, Nagano University

Korea - Resume of Delegate

Name: Chun Keun Kim

Position: Senior Instructor of Management Training Office, Small & Medium Business Training Institute, SMIPC (SBC)

Contact Info: 931 Wongokdong, Ansan City, Kyunggi-Do, Korea
Tel : 82 31 490 1265
Fax : 82 31 490 1118
E-mail: goodnews@sbc.or.kr

Education:

1988.2 B.A. in Economics, Seoul City University
Master of Business Administration, Seoul City University Graduate School
1998.2 MA of Education, Inha Graduate School
2001. Ph.D . Coursework in Marketing (processing), Inha Graduate School

Profile:

Financial Analyst, Small & Medium Industry Promotion Corporation (SMIPC)

1994 Manager of Training Planning Division, SMIPC
2001 Senior Instructor of Management Training Office, SMIPC
(Lecture field: Marketing, Logistics, Sales)

Writings

Co-authored in "Practical Marketing Strategy for Korean SMEs"
Co-authored in "Sales Management"

Korea - Resume of Delegate

Name: Kyung-Eui Hong

Position: Assistant Director, Int'l Cooperation Div., SMBA

Contact Info: 920, Doonsan-Dong, Suh-Gu, Taejeon City, Korea
Tel: 82 42 481 4367
Fax: 82 42 472 3276
E-mail : kehong@smba.go.kr

Education:

1986.2	B.A. in Business Administration, Dankook University
1996.4	Master of Business Administration, Asian Institute of Technology (Bangkok, Thailand)

Profile:

1983. 7.	Assistant Chief of Saving Sub-division, Mapo Post Office Ministry of Communication
1991. 3.	Assistant Director of International Standards Division Industrial Advancement Administration, IAA
1996. 5.	Assistant Director of Finance Assistance Division, Small & Medium Business Administration, SMBA
1998. 7.	Assistant Director of Industrial Site Assistance Division, SMBA
1999. 6.	Assistant Director of Industry Survey Division, SMBA
2000. 11.	Assistant Director of International Cooperation Division, SMBA

Russia - Resume of Delegate

Name: Anton Panfilov

Position: CEO/President Tradition Ltd.

Contact Info: Litovsky Blvd.,7, 117593, Russia
http://www.tradition.ru;
http://www.arsenal2000.com
Tel: 7-095-427-1101
Fax: 7-095-425-0000
E-mail: anton@tradition.ru
ICQ: 15249033

Education:

1984	Systems Engineer, Cybernetics

Profile:

1985 -1992	Researcher computer science, Computing Center, Academy of Sciences
1993 - Present	CEO/President Tradition Ltd., Business development strategy

Singapore - Resume of Delegate

Name: Chiew Pung Chan

Position: General Manager, Division of Enterprise Technology,
RichLand Logistics Services Pte Ltd.

Contact Info: 9 Changi South Street 3 #07-02
Freight Links Express Disticentre
Singapore 486361

Education: 1993 BS in Information Systems and Computer Science (National University of Singapore)
1995 MS in Management of Information Technology (National University of Singapore)

Profile: 1994-1999 - Distribution Systems Engineer in Hewlett-Packard Far East

- Implemented SAP SCM solution in AP distribution network for HP Commercial Channel
- Architected the HP AP Order Fulfillment Process

1999-2000 - AP Distribution Engineering Manger in Hewlett-Packard Far East

- Responsible for Product Life Cycle Management
- New Product Introduction
- Inventory Management Process
- Product Postponement Process

Singapore - Resume of Delegate

Name: Ms. Cynthia Ng Hwei Hoon

Position: Program Manager, Planning & Engineering Division

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Education: 1996 – Bachelor of Business Administration (BBA)
(Major: Logistics Management, Minor: Marketing)
National University of Singapore

Profile: (1999 - 2000)

a) Order Analyst, APDO
(Hewlett Packard Far East Pte Ltd, Asia-Pacific Distribution Operations)

- Front-End interface with China customers in the areas of Order Management, Process Alignments, Expediting shipments, Customers Feedback System (CFS), Pricing issues and other related issues pertaining to distribution operations.
- System Usage: SAP, Electronic Order Pricing(EOP), First/CFS database system.

b) Planner, Supplies Products
(Hewlett Packard Far East Pte Ltd, Asia-Pacific Distribution Operations)

- Materials planning & procurements for Asia-Pacific.
- Direct liaison with US planners to determine the monthly inventory levels within Asia-Pacific for pulling and pushing of shipments/exceptional handling of shipments.
- Inventory Management for various product-lines in Singapore as well as for various Country Depot Operations (CDOs) in Asia-Pacific (egs. China, India).
- New Product Introduction roll-out, Product Shipping Requirements (inclusive of Special product packaging for Export/Import requirements).
- Working closely with Product Engineers and Logistics Analysts.
- Monthly reporting of product-scraping activity, inventory-costing for Asia-Pacific (per product-lines).
- System Usage: SAP, ICON procurement system (via net).

Chinese Taipei - Resume of Delegate

Name: Anthony Fu-Wha HAN

Position: Professor of Transportation and Dean, College of Management
Director, e-Business Research Center
National Chiao Tung University, Hsinchu, TAIWAN

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Education:

Ph.D.	University of California, Berkeley, Ca. USA, Dec. 1984.
C.E.	Massachusetts Institute of Technology, Cambridge, Ma. USA, Dec. 1981.
M.S.E.	National Taiwan University, Taipei, Taiwan, June 1976.
B.S.E.	National Cheng Kung University, Tainan, Taiwan, June 1974

Profile:
Dean of Student Affairs, NCTU, 8/94 – 7/98.
Chairman, Dept. Transportation Engineering & Management, NCTU, 10/87--7/90.
Board Director, Chinese Institute of Transportation, 7/89--6/91; 8/93 till now.
Council Member, City and Urban Planning Council of Hsinchu, 10/89--6/92.
Invited Keynote Speaker by the Australia Logistics Management Association, the 7th Australia National Logistics Management Conference, Melbourne, April 4-9, 1992
Editorial Advisor, *Commerce Modernization Bimonthly* by MOEA, 11/93-12/97.
Editor-in-Chief, *Journal of the Chinese Institute of Transportation* (in Chinese), 1/99--12/00.
Editorial Advisor, *IJPDLM, International Journal of Physical Distribution and Management* by MCB University Press, since 12/93.

Professional Interests:

Business Logistics Management	Supply Chain Management
Vehicle Routing and Scheduling	Network Modeling Analysis

Principal Investigator of more than forty-three research projects since 1985.

Publications:

More than seventy-eight professional journal and conference papers, and more than fifty-nine research reports and other publications.

Papers appeared in *Transportation Research, Transportation Research Record, ASCE Journal of Transportation Engineering, Transportation Planning Journal (in Chinese)* and other professional journals.

United States - Resume of Delegate

Name: Don Lloyd Williams

Position: President & CEO, Princeton Healthcare

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Marietta, GA. 30067 – USA
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Profile:

Over the last twenty years Mr. Don Lloyd Williams had worked extensively in international trade in a variety of executive positions for international companies. Mr. Williams is one of the nation's leading experts on international trade in Sub-Sahara Africa, Latin America and several other key emerging markets.

Currently, as President and CEO of Princeton Healthcare Inc., Mr. Williams has worked extensively in West Africa and Latin America developing business opportunities in these emerging markets. In fact, Mr. Williams lead Princeton Healthcare, Inc. into Cote D'Ivoire (Ivory Coast), and established during 1998 the first EX-IM Bank backed transaction in this region of Africa. Subsequent to this, Mr. Williams also completed several multi-million dollar transactions in this region. Prior to this position, Mr. Williams was President of Princeton Medical Enterprises, a regional distribution company. Formerly an executive with international conglomerates such as Siemens, Daimler Benz (Dornier Medical), Hewlett Packard Corporation, and C.R. BARD. Mr. Williams has had extensive experience and has been responsible for growing international business opportunities in Europe, Canada and Latin America, and developing healthcare technology and services in emerging international markets.

Mr. Williams has worked with several international organizations based in the US, including the International Chamber of Commerce, US AID, World Bank, IMF, African Development Bank, IBD, IPIC, Trade Development Agency, Advocacy Agency, The United States Export- Import Bank, World Trade Organization, and the Department of Commerce- Foreign Service Organization.

Most recently Mr. Williams was appointed Advisor to the United States Department of Commerce, Industry Sector Advisory Committee on Trade Matters for Small, Medium Sized and Minority Firms.

Mr. Williams also serves as a Board of Director with the Small Business Exporter Association, and a member of the Health Industries Distributors Association. He is a former Adjunct Professor of Marketing, Business Policy, and Project/Program

Management. Mr. Williams holds a BS from Boston University and a Masters in Management from the Graduate School of Engineering from Northeastern University. Mr. Williams is also a graduate of Columbia University's, Graduate School of Business-Executive Marketing Program.

Vietnam - Resume of Delegate

Name: Nguyen Quang Dung

Position: Director
Department of Industry
Ministry of Planning and Investment

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Education: 1975 BS, Modova University

Profile: 1975 - 1995, Senior Expert
Department of Industry
State Planning Committee

1995 - 1998, Deputy Director
Department of Industry
Ministry of Planning and Investment

1998 - Director
Department of Industry
Ministry of Planning and Investment

Vietnam - Resume of Delegate

Name: Tran Quoc Trung

Position: Expert
Department of Industry
Ministry of Planning and Investment

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Education: 1994 BS, Mining and Geology University
2000 MA, National Economics University

Profile: 1996 - Expert
Department of Industry
Ministry of Planning and Investment

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