

**INTEGRATED SUPPLY CHAIN
MANAGEMENT: A COMPARISON OF
EXPERIENCES AMONGST
AUSTRALIAN AND MALAYSIAN
COMPANIES**

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Abstract

This paper presents the findings from the first phase of a two-phase project that examines integrated supply chain management (ISCM) in Australian and Malaysian businesses. Phase 1 in Australia involved detailed in-company research to document, in the form of case studies, how suppliers have adopted the supply chain management strategy and practices, the specific benefits achieved and the problems/challenges faced. In Malaysia, Phase 1 took the form of a focus group discussion session involving representatives from five organisations. Phase 2 of the project will involve a large questionnaire survey of organisations in both countries. This paper presents the key findings from Phase 1 of the project.

For the Australian suppliers, the cases indicate that there are significant benefits derived when implementation has been strategic rather than reactive. These include 1) lead time and inventory reductions, 2) improved data accuracy and customer service, 3) better demand forecasting and revenue increases coupled with cost reductions. Limitations recorded included 1) an increased level of complication in despatching processes, 2) problems with system compatibility, 3) some added complications in marketing practices and 4) greater vulnerability to sudden changes in demand (ie through operating more streamlined systems. The Malaysian focus group discussion results identified Malaysian retailers to be lagging behind their Australian counterparts in the adoption of ISCM. Many MNCs operating in Malaysia are well ahead of their local counterparts in the implementation of the elements of ISCM. The current approach taken by Malaysian companies appears to be "Reactive" or "Tactical" with barcoding and some EDI being the main technologies being adopted. However, companies interviewed showed interest and enthusiasm to apply this technology in the future.

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INTRODUCTION

A major focus of mass merchants in advanced economies has been the integration of core processes across the entire supply chain, referred to here as Integrated Supply Chain Management (ISCM). Some of the new approaches being implemented include cross docking, point of sale (POS) data capture, advanced shipment notification (ASN) and vendor managed inventories (VMI). In Australia, the enabling mechanism for these new methodologies is the adoption of the EAN (European Article Numbering) system as the standard means of capturing and transmitting data electronically. This system is being actively promoted by mass merchants to their suppliers in order to facilitate a "customer driven supply chain".

In this paper we examine the implementation of ISCM amongst a group of Australian and Malaysian companies. More specifically, we examine the factors affecting the decision to implement ISCM, the implementation approach/strategy adopted by the companies, the enablers of implementation and the benefits and limitations of ISCM. The results presented in this paper are based on four case studies completed in Australia and a focus group discussion session held with representatives of five Malaysian companies. This forms Phase I of a two-phase project examining ISCM in Australia and Malaysia. Phase II will involve a postal questionnaire survey that will be conducted in both countries.

The remainder of the paper is structured as follows. The next section discusses issues relating to ISCM including the ISCM enabling mechanisms and techniques. The research methodology section is then presented. The key findings from the Australian case studies and the Malaysian focus group discussion session are then presented. The final section presents the conclusions.

ISCM AND ENABLING MECHANISMS AND TECHNIQUES

A review of the literature relating to ISCM practices was conducted covering issues such as the nature and meaning of integration, enabling mechanisms (standard numbering and Barcoding, EDI, the Internet and other software developments) and specific practices and techniques (QR, VMI, supplier partnerships, ASN's, 2D barcodes and cross docking).

Opinion on what constitutes complete integration varies, and in light of rapidly changing technologies and networks is perhaps best regarded as an evolving process. Cottrill (1997) sees this evolution as moving toward a supply chain that functions as a corporate entity, spanning a virtual enterprise without reference to traditional company boundaries, and driven directly by customer demand via electronic storefronts. He believes that this will drive major changes in corporations eventually leading to greater use of outsourced services. Interestingly, Cottrill (1997) also believes that the key to implementation lies in focusing initially on introducing changes within the company [The Retailer/Mass Merchant], and then migrating the process outwards to suppliers and customers. Putzger (1998) states that the key criterion in implementation is correct choice of information technology, and that the use of third party providers for both transportation and information management is the option chosen by successful performers. The initial major benefits resulting being cost and cycle time reductions. Wood (1997) on the other hand emphasises the importance of aligning goals across functions through cooperation and collaboration, citing the traditionally poor alignment of goals between manufacturing and sales / distribution functions as an example of areas where better alignment is a pre-condition for improvement in supply chain management practices generally.

This cooperative theme is further supported by other writers (Morton, 1997; Lawrence, 1997; Wood, 1997; Fernie, 1994), and perhaps best captured by Parnell (1998) when he states that supply chain integration really occurs when:

".....customers and suppliers establish tight partnerships with the objectives [and probable outcomes] of reduced inventory, shorter lead times and better service to the customer". Clancy (cited in Putzger, 1998) describes supply chain integration as:

".....attempting to elevate the linkages within each component of the chain, [to facilitate] better decision making [and] to get all the pieces of the chain to interact in a more efficient way". And thus "...create supply chain visibility [and] identify bottlenecks".(Putzger, 1998.1)

The basis of integration can thus be characterised by cooperation, collaboration, information sharing, trust, partnerships and shared technology. Some of the enabling mechanisms and techniques used by organisations to develop ISCM are briefly described below.

Standard Numbering and Barcoding

The use of standard numbering allows unique worldwide identification of products, shipments, organisations, locations and a range of variable data such as batch identification, use by dates etc. The bar codes allow these numbers to be read by a scanner and input into a computer thus enabling automatic data capture.

Electronic Data Interchange (EDI)

EDI is direct computer to computer exchange between trading partners of agreed and structured business documents such as purchase orders, invoices, consignment notes, remittance advices and customs documents. The combination of EAN numbering, barcode scanning and EDI enable organisations to link the physical movement of goods to the electronic data related to those goods. Thus the potential is created for true business-to-business electronic commerce, and the capability produced for inventory, logistical and sales information to be widely understood across the entire supply chain.

Implementation of the above enablers is characterised in three different forms:

Reactive: Purely satisfying a request from a trading partner. This is viewed as the lowest level of implementation and is generally restricted to applying barcodes to finished goods, with perhaps some EDI transactions included. Such implementations can be considered as just adding cost to the business.

Tactical: This approach seeks to extend implementation to specific processes within the business to improve efficiencies in (say) production or inventory control. At this level adequate planning, costing and definition of the project are recommended, and real cost savings are achievable.

Strategic: Implementations of this type seek to introduce integrated supply chain management techniques across the entire supply chain in a planned, staged manner. The first step is usually the introduction of the elements of the EAN system within the initiators business, but this is seen as very much the first steps of a long term project expected to deliver significant savings and other business benefits.

The Internet

Cottrill (1997) contends that the Internet will be the enabler that ultimately revolutionises management of the supply chain, and indeed the way business is conducted in some industries. Quoting prominent consultants, he talks of a shift to "communities of interest" (ie groups of companies) representing a new competitive force in markets with common strategic goals. Motivated by a common need to deliver products quickly in a customer driven market, the importance of logistics in this context will depend on its' importance as a differentiator within the group, with cooperation likely between competitors in areas where they are likely to benefit. The ability of the Internet to overcome problems common to previously used networks will be a major facilitator of this process. The development of a program linking enterprises through common communications infrastructure via the Internet allowing real time communications across corporations has already been done (Collaborative Planning Forecasting and Replenishment - CPFR). The prospect of a "virtual supply chain" is already in operation in the computer industry where:

"....several suppliers will manage raw material inventory levels and schedule inbound shipments via self-service menus of business functions. Customers will place orders through an electronic storefront, and when orders are activated they will automatically take account of capacity and scheduling constraints" (Cottrill, 1997).

Software Developments

The development of software specifically aimed at addressing the needs of managing the supply chain has been driven by the shift in focus from re-engineering business processes, to re-engineering to total supply chain. Harrington (1997) divides these into three groupings comprising: 1) Supply Chain Planning and Execution (SCP&E), 2) Transportation Management Systems (TMS), 3) Warehouse Management Systems (WMS). In the retail area there are four areas that software packages can impact, covering demand planning, distribution planning, TMS and WMS. In this environment no single package will be able to adequately address all four issues, necessitating companies to purchase more than one. The issue of inter-operability thus becomes a primary selection criteria. The use of "Data Warehouses" between packages is a popular means of overcoming this issue. The future trend in this area is for software providers to merge as they seek to broaden their offerings by taking over complementary vendors.

Quick Response (QR)

Although largely enabled by interfacing ERP software packages with automated data capture through the use of standard numbering, barcodes and EDI, QR is more than the use of technology:

"QR has nothing to do with software...it is an entire philosophy of timely delivery, customer service and quality product" (Miller S., cited in Musselman, 1997).

QR elements include tracking of inventory levels at all points of the supply chain, use of Point of Sale (POS) capture of sales data to enhance forecasting, standardised enterprise wide documentation, direct order entry from sales staff in the field and real time feedback to sales staff of availability, lead times etc. Other aspects of QR systems could include advanced warehouse management systems (WMS), radio frequency data communication (RF/DC) systems, automated material handling, floor ready merchandise processing, enterprise wide resource planning and demand chain wide resource planning.

Vendor Managed Inventories (VMI)

Using VMI manufacturers manage the flow of product to distribution centres using pre-defined inventory targets. The manufacturer monitors inventory levels at the retailer's distribution centre and re-orders to maintain an agreed level of inventory. The philosophy behind this is to use the expertise of the manufacturer to more efficiently manage the retailer's inventory. There is also an advantage gained by reducing the complexity of inventory management through decentralisation. It is easier for manufacturer's to manage 100SKU's each than the retailer managing 50,000 individual SKU's.

Supplier Partnerships

Tait (1998) asserts that "Companies that make supplier relationships a priority are rewarded with better financial performance and greater customer satisfaction". Despite this, a report by A. T. Kearney (1997) found that few firms really leverage their supplier relationships, with less than 20% of North American and Canadian companies actively involving their suppliers in key business processes. The major issue identified is the need to identify and include key strategic suppliers as early as possible in order to set joint objectives and align business goals. Traditional supplier relationships have been characterised by what Dyer et al (1998) describe as the "arm's length" model, incorporating multiple suppliers, avoidance of long term (or in some cases any) commitments and regular price reviews. The rationale for this strategy has been to "...find mechanisms to offset or surmount these sources of suppliers' power" (Porter, 1980). The partner model, on the other hand, features the sharing of information (and in some cases assets) between organisations, recognising areas of common interest and combined competitive advantage.

Cross-Docking

The time and labour involved in physical distribution operations is a major cost issue, and cross-docking of shipments is a method used to allow goods to move through distribution centres without intermediate storage. There are a number of different variants of this technique depending on whether goods are being delivered in store specific units, store specific pallets or at a case level. The level at which it is used is largely dependent on how advanced trading partners are in terms of their ability to control scheduling, transportation and information issues. The benefits can be substantial, with studies estimating that retailers can reduce labour and space requirements by up to 50% by using true cross-docking (Andersen Consulting, 1994).

Advanced Shipment Notification and 2-Dimensional Bar Codes

ASN's are used as a means of notifying retailers of the amount and type of product shipped to a distribution centre from a manufacturer. This allows pre-receipt processing to be carried out at the distribution centre enabling better planning and allocation of workloads. Added to this is the use (where appropriate) of 2-dimensional (2D) bar codes using a matrix design, allowing more information to be stored. The Andersen Consulting (1994) report indicates two situations where 2D codes are useful: 1) when loads are delivered before ASN information can be processed, 2) when EDI is not available.

RESEARCH METHODOLOGY

Four case studies were conducted in Australia using semi-structured interviews. These companies are all suppliers to a major retailer based in Melbourne and were selected from a list of suppliers provided by the retailer. Interviews were conducted on-site using a protocol developed from the literature review. The interviewee in each company was the middle/senior manager most closely involved with the implementation of ISCM. Each interview lasted approximately two hours. The information gathered from each company was written up as a case study and forms the basis of the results presented in this paper. Company 1 is a small, family-owned business that imports and supplies a wide range of home-ware products to a number of retailers. Company 2 is also a small importer and supplier of speciality gift items to a number of retailers. Company 3 is manufacturer of a variety of Manchester products and Company 4 is a manufacturer of ladies outer-wear. Full details of the four companies involved are available from the authors.

In Malaysia, a focus group discussion session was held at the Malaysia Campus of Monash University. Five companies participated in this session that lasted for a total of four hours. Each company was represented by its Managing Director, the Executive Director or the General Manager. The five companies represented the following products/industry sectors: Electronics (watches, LCD, etc.); industrial and speciality chemicals; printing; power, telecommunications and railways; and latex and textured products. The interview protocol used for the case study research in Australia was used for the focus group discussion session in Malaysia.

A summary of the findings is presented in this paper. More detailed results are available from the authors.

AUSTRALIA CASE STUDY FINDINGS

Implementation Approach

There have been a range of implementation approaches observed from a full "Strategic" implementation to a transitional "Tactical" – "Reactive" and a purely "Reactive" approach. At this stage there are indications that there may be links between the approach taken and:

- Nature of the product and the competitive environment.
- Vision and organisational level of the project driver.
- Degree of involvement of senior management.
- Organisational culture and approach to strategic planning.
- Company size

Factors Affecting the Decision to Implement

The primary factors observed for the implementation of Integrated Supply Chain Management practices at the companies were:

- The need to improve delivery performance.
- The need to reduce cost and maximise revenue.
- Compliance with customer requirements.
- Experience of poor quality service from third party providers.
- Part of an overall supply chain management strategy (eg QR program).
- Driven by a change in management.
- Desire to use new technologies for competitive advantage.

Companies implementing "Strategically" seem to be more pro-active and "visionary" in their implementations. At the "Tactical" end of the spectrum there appears to be more of a compliance focus. There is also some evidence of dissatisfaction with third party providers, and that they may be used by some companies as a temporary fix only.

Enablers of Implementation

As part of the process of implementation the following activities have been generally undertaken in order to facilitate the process:

- Benchmarking within and across industries both locally and overseas.
- Use of consultants to provide a catalyst for questioning of business assumptions.
- Implementation advice sought from hardware / software vendors.

The "Strategic" implementers seem to have a higher degree of involvement in the use of benchmarking and consultants, whereas the "Reactive" companies seek the minimum amount of external advice.

Implementation Strategies

As part of the change management process the following strategies for implementation have been observed:

- Use of third party providers.
- Comprehensive education programs.
- Visits to the EAN works site and use of their training facilities.
- Use of employee teams to plan and implement ISCM.
- Linking of "EAN Way" to other wider supply chain initiatives (e.g. QR program).
- Linking implementation to government funded programs.

The "Strategic" implementers seem to have a more creative approach to implementation, whereas the "Reactive" companies either implement with the minimum amount of involvement, or opt for the third party provider.

Benefits from ISCM

The major benefits identified from the implementation of Integrated Supply Chain Management practices at the companies at the "Strategic" end of the spectrum were identified as:

- Improvements in data accuracy.
- Inventory reduction.
- Shorter delivery lead times.
- Improved customer service.
- Streamlining of invoicing processes.
- Improved forecasting/demand management through use of point of sale data.

- Achievement of preferred supplier status.
- Improved competitive advantage.
- Improved staff morale.
- Multiplier effects (e.g. ability to redirect funds freed up as a result of cost savings).
- Cost reductions.
- Revenue Increases.

The major benefits identified from the implementation of Integrated Supply Chain Management practices at the companies at the "Reactive" end of the spectrum were identified as:

- Achieving preferred supplier status.
- Elimination of errors generated by third party providers.

There is also some evidence to suggest that the benefits from implementation are not as obvious for some organisations as for others, and that this may be a function of the nature of the product, competitive environment, company size, culture of the organisation, strategic focus of the company etc.

Limitations of ISCM

The major limitations identified from the implementation of Integrated Supply Chain Management practices at the companies at the "Strategic" end of the spectrum were identified as:

- Increase in packing time and a general complication of delivery processes.
- Problems with system compatibility sometimes limited the ability of companies to extract the full benefit from implementation.
- Initial implementation can create additional stress within the organisation (ie through pressure on cultural factors).
- Implementation can result in more complicated marketing processes.
- As systems become more streamlined there can be an increase in vulnerability to sudden changes in demand.

The major limitations identified from the implementation of Integrated Supply Chain Management practices at the companies at the "Reactive" end of the spectrum were:

- Cost of initial implementation was seen as a non-recoverable cost.
- There was some evidence to suggest that third party providers did not provide a viable long-term alternative.
- Increase in workload created by the shifting of work previously done at the DC's upstream to the supplier.
- Increase in complication due to additional steps in the dispatch process.
- Additional constraints on delivery (e.g. cannot deliver without an ASN).

Future Trends and Other Issues

In the next 2-5 years all organisations saw themselves moving towards:

- Establishing WEB sites for:
 - Creation of a direct customer interface.
 - Posting of product catalogues.
 - Creation of an interface with current customers' and suppliers' systems.
 - Possibly tapping into new markets.

All parties agreed that electronic trading (in some form or other) was the future of business generally. In general discussion a number of other issues were raised:

Relationships with major retail chains tend to be buyer dependent (i.e. the relationship is more with the buyer than the organisation).

There was an implication in the application of Integrated Supply Chain Management practices that cooperative arrangements needed to be promoted between the retailer and the supplier.

MALAYSIAN FOCUS GROUP DISCUSSION SESSION FINDINGS

Malaysian manufacturing industry has developed rapidly over the past decade with many MNCs establishing manufacturing plants in various parts of the country. This was largely a strategy pursued by MNCs to benefit from the lower labour costs however this advantage is slowly being lost as labour costs are increasing in Malaysia. Many organisations are already looking for manufacturing sites in neighbouring Thailand where labour costs are much lower than in Malaysia. Many Malaysian manufacturers are making large investments in automation in order to overcome the problems of shortage of labour. Outsourcing of components and subassemblies is also on the increase. With these changes taking place in the Malaysian manufacturing industry, all participants recognised the adoption of ISCM as a key future strategy, especially for the growing automotive and electronics sectors of the industry.

The view of the focus group participants was that the MNCs are well ahead of their local counterparts in adopting the elements of ISCM. The local suppliers to the MNCs are beginning to adopt the basic tools and techniques of ISCM however their current approach can be described as "Reactive" or "Tactical". Many local manufacturers are using systems that have been developed in-house over many years however, these companies recognise the importance of adopting ISCM. Barcoding and EDI are the most popular technologies used by Malaysian manufacturers. Within the chemical industry its use was highlighted but mainly for traceability within the organisations. Within the printing and publishing industry it was reported that customers orders were received through EDI however barcoding was not extensively used. The comment was made that "We do what customers ask us to do." i.e.. a "Reactive" approach.

The major retailers in Malaysia appear to be lagging their Australian counterparts in adopting ISCM and hence are not placing demands on their suppliers to adopt barcoding or EDI. Most Malaysian retailers have not reached the level of sophistication that has been achieved in Australia with many local retailers having developed in-house systems to facilitate control. Participants regarded e-commerce as timely for Malaysia and agreed that action needed to be taken at the national level, perhaps led by the Federation of Malaysian Manufacturers (FMM).

Cost was identified as the major impediment to adopting ISCM in Malaysia. This is particularly a concern for SMEs. Having the right mindset was also identified as a major issue particularly amongst the older managers and family-business owners. The younger generation is seen to be more open-minded and ready to do business in the Western management style.

Currently there is a considerable level of activity within Malaysian businesses with respect to the implementation of quality management principles and the ISO 9000 series of standards. The Malaysian government has been the major driver for implementing ISO 9000 amongst businesses. Interestingly, many schools in Malaysia have adopted the ISO 9000 standards. The lessons learnt from the quality movement can be used as a catalyst to move towards ISCM. Participants see government support as being essential for the adoption of ISCM amongst Malaysian businesses.

CONCLUSIONS

The evidence gathered from Australia so far indicates that there are significant benefits from execution of Integrated Supply Chain Management practices when they are implemented in a "Strategic" fashion, and that companies that implement with a "Reactive" mindset perceive few (if any) benefits. Whether the approach adopted for implementation ("Strategic", "Tactical" or "Reactive") determines the degree of benefit derived, or whether this is a function of other factors is not clear at this stage and will be examined in

more details in Phase 2. What is also not clear is whether it is possible (or indeed appropriate) in all cases to implement at a fully strategic level, and whether factors such as the nature of the product, competitive environment, size of the company, culture of the company, strategic posture etc act as moderating influences. The case study results indicate that these would be appropriate areas for the focus of further research in order to gain a better understanding of the circumstances and conditions under which the results of implementation can be predicted and optimised.

The Malaysian results to date indicate a "Reactive" or "Tactical" approach being taken by the local suppliers with the retailers not having reached the level of sophistication that currently exists in Australia. All participants recognised the importance of taking a "Strategic" approach to ISCM. They also identified the need for a catalyst (the Government) to motivate companies to adopt the ISCM system.

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