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# Information Systems and the Management of Financial Risk in Supply Chains

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## **Information Systems and the Management of Financial Risk in Supply Chains**

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### **Abstract**

Information systems have developed along the supply chain to support logistics management in all types of industries. Logistics strategies have focused on reducing the levels of working capital by increasing the efficiency of information flow from market to raw materials suppliers. Similar developments have also occurred to support other business processes, for example connecting together new product design and marketing databases to create virtual corporations. This paper addresses the financial implications of these changes and examines the way that financial risk is traditionally managed in supply chains and presents an organizational model of likely future developments. The research has theoretical implications for cooperative strategy development in the management of financial risk between multi-nationals and their economic partners, and illustrates the role of information systems in developing virtual finance strategies.

### **Introduction**

The development of integrated supply chains has been a major organizational phenomenon that has been enabled by the innovative use of information technology. Large corporations have made significant progress in linking their information systems to share data with trading partners. The extent that an organization has been able to influence the process of integration has been determined primarily by the power of the buyer or supplier. The powerful buyer groups have used the integration of the information systems to encourage closer relationships with a small number of suppliers, rather than to manage the complexity of a large number of relationships. Two of the key benefits achieved have been the reduction in the amount of working capital held in the supply chain and much shorter lead times in the development of new products (Lee and Billington 1992). The objective of this paper is extend the use of IS by examining the potential of applying the basic principles of 'Just in Time' techniques already used in the management of the physical supply chain to reducing the costs and uncertainty of the associated financial processes.

The financial functions within multinational companies have made significant progress in linking the information systems within their own organization to reduce a corporation's overall cost of purchasing financial services and to minimize the amount of idle cash held. This has often been driven by the need to manage foreign exchange transactions and the associated high volumes of cash transactions typified by companies such as Motorola (Holland et al 1994). Although this has resulted in substantial gains and streamlining of financial systems *within* organizations, the financial management along supply chains has hardly changed and the potential benefits have yet to be realized. This paper proposes a theoretical model which explores the potential of using inter-connected information systems (possibly including Internet and Intranet solutions) to link financial information along the supply chain. It suggests how the total financial service costs can be minimized, and estimates that the total savings will be approximately 1% of sales turnover. The roles of the partners are analyzed and barriers to implementation discussed.

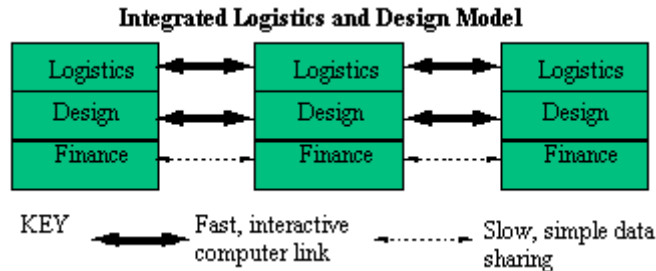
### **Purchasing of Financial Services**

In comparison with other business functions the purchasing and management of financial services is relatively primitive. Although financial institutions have developed many new products and attempted to delivery services quicker, the principal outcome has been improved efficiency within the financial services organizations. Many international manufacturing organizations are concentrating the purchase of components with trusted global partners which supply the corporations' plants throughout the world. However there are few documented examples of corporations centralizing responsibility for the purchase of financial products and even fewer of working examples of the single sourcing of the purchase of a financial service from a single financial service company. This is somewhat surprising given that the barriers in centralizing the services for physical products are much higher than those for financial transactions that can be initiated and settled electronically. This is particularly true for the cash and short term investments of a corporation.

Cash holdings can be directly compared with physical stocks and work in progress with one major difference i.e. cash is universal. The cost of holding cash can be reduced by the interest gained by lending it to a bank, the financial sector's equivalent to a warehousing company. With financial management there is a second benefit that cash is a commodity and lines of credit can be arranged with financial institutions to fund short term cash shortfalls. While the credit lines can often be a cheaper option than tying up capital in cash, corporations do not always trust their financial institutions to keep short term credit lines in place when they are needed. Smaller organizations have not been powerful enough to develop such methods, and the limited and periodic flow of information between the banks and their customers can result in the reactive management of a relationship with the prime interest appearing to be the protection of the bank assets.

It is proposed that the relationship with financial institutions should mirror the quality of relationship with other key suppliers, where sensitive manufacturing and commercial information is often shared. The aim is to have cooperation along the supply chain and competition across them. Schematically the differences in the present positions of the

information flows for physical and financial movements are shown in Figure 1. From this it is clearly seen that the financial sets of information are mainly unrelated as far as the supply chain is concerned, and there is no attempt to manage it as a single financial entity.



**Figure 1. Integrated Supply Chain Model**

Each organization unit manages its finances autonomously. The banks concerned do not usually have the organizational awareness and capacity for making such major changes which will result in a decrease in income for the industry overall (Holland et al 1997). It is only the large partners in supply chains who can influence the trend towards the alignment of the physical and financial flows of information (Davis 1993).

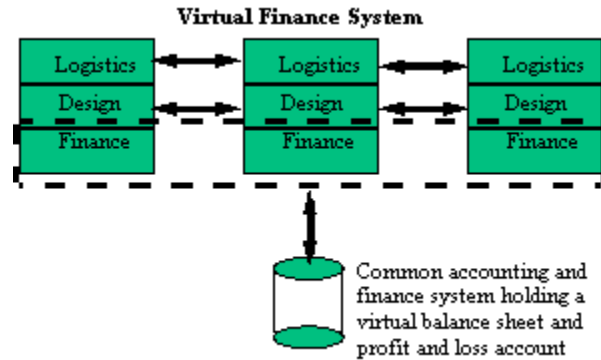
### **Managing Financial Risk**

The traditional method for managing financial risk is for the more powerful company in the transaction to pass the maximum amount of financial risk inherent in a transaction on to their weaker trading partner. An example would be where a large purchaser insists on purchases being priced in their own currency and negotiates the maximum credit period to reduce their own funding costs. The finance function at the supplier would normally be required to manage the financial risk after the contract had been agreed by the sales staff. Similarly a common technique used by powerful corporations to minimize the impact of the uncertainty on the dates payments will be received from customers is for the central treasury to control the dates payments are made to suppliers. There are inherent inefficiencies in the approach taken in these two examples because (i) the market's view of the financial risks (future movements in the exchange rate and credit risk of the customer) of a transaction are not incorporated into the price agreed with the foreign customer and (ii) the cost of managing the foreign exchange risk, managing the uncertainty in the cash flows, exchanging the currency and raising the funding for the transaction falls on the trading partner with the weakest purchasing power with the financial institutions. These examples are typical of the current position and many other similar examples could have been given.

### **Proposed Approach**

EDI systems are now routine for logistics management and inter-organizational systems have been implemented for other business processes such as new product design and shared database marketing systems (Rayport and Sviokla 1995). The initial fears regarding the passing of sensitive information between separate legal entities has in

general proved groundless. It is therefore a simple systems development task to enable separate organizations to coordinate their financial information so that the smaller partners (which are considered a much greater financial risk by banking institutions) are able to outsource many of their financial dealings to their larger trading partners in the supply chain. The sharing of the risk will enable the purchase of cheaper financial services and more efficient management of cash. The flows of financial information should conceptually mirror those for the physical movement of goods as shown in Figure 1 above with the addition of much stronger relationships with financial institutions as shown in Figure 2.



**Figure 2. Virtual Finance System**

There is the potential for corporations to provide 'trusted' financial partners access to a company's cash flow projections based on agreed sales and purchase requirements. When the corporation is expected to have a cash shortfall the financial institution would be able to proactively provide the funding at a pre-agreed rate without having to be asked to give advance notice to ensure the corporation does not over trade. The advance warning of funding or cash surpluses would improve the bank's ability to manage its own assets and pass on a portion of the benefits back to the customer. Once the organizational commitment to providing access to financial information has been agreed all of the aspects of financing of trade can be examined for potential cooperative improvement.

### **Scale of Potential Benefits to Trading Partners**

Using the above concepts a small example can be used to estimate the benefits of the approach, with the more powerful trading partner taking responsibility for managing the financial risk of the transaction. It has a centralized treasury operation with access to the capital and money markets. This gives it a huge advantage in buying financial services over their weaker trading partners purchasing services from a local bank. Typically, on a conservative basis, it is estimated that for the much larger multinational trading partner that on average: their weighted cost of capital is 2% less than their trading partners; the % margin charged for foreign exchange is 0.45% less; the % margin for hedging foreign exchange is 0.65% less; the transactional cost of moving funds internationally is \$10 as opposed to \$30 for the smaller partner. Using these estimates a calculation is performed in Table 1 below for charges from the financial institutions for settling one import transaction of \$50,000 of goods or services with a credit period of 30 days.

<u>Activity</u>	<u>Costs</u>	
	Large Organization	Small Trading Partner
Funds Transfer	\$10	£30
Foreign Exchange (FX)	\$25 (0.05%)	\$250 (0.50%)
Hedging FX Exposure	\$75 (0.15%)	\$400 (0.8%)
Funding Credit	\$411 (10%)	\$493 (12.00%)
<u>Total</u>	\$521 (1%)	\$1,173 (2.3%)

**Table One: An Illustrative Example of the Potential Financial Benefits**

### Discussion and Conclusions

The advent of inter-organizational financial systems will enable trading partners to benefit by ensuring that each component of the financial transaction is purchased by the trading partner with the lowest cost source of a financial service. The costs and benefits need to be transparent to the cooperating partners to create the incentive for the large organizations and their trading partners to share the benefits of reduced financial costs for the supply chain as a whole. This type of cooperation is common for EDI systems that support the flow of good and services. An estimate of the potential savings from such an arrangement can be made along with the potential cost and effort to implement a solution. The distribution of the resulting overall benefit can then be negotiated between the various partners. The implementation of a virtual finance system requires an integrated set of finance systems and the associated organizational change inherent in re-designing the management of the finance process. The paper has extended the concept of JIT to the provision of financial services in the supply chain. It has shown, using some simple examples, how major savings can be made using the power of the large multinational partners. The IT capability is largely already in place and the pace of implementation will be limited by the abilities of the cooperating companies to achieve organizational change. The alignment of financial flows of information with those of physical products is a logical development in supply chain strategies and will have a significant impact on business operations and banking.

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