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Managing the Supply Chain: the role of information and communications technology (ICT) as a key enabler of the process

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Introduction

Supply Chain Management (SCM) has gained increasing prominence in recent years. It is an approach which is being viewed by companies in many sectors as a key source of competitive advantage. This article defines SCM and outlines the role of information and communications technology (ICT) as a key enabler of the process.

What is SCM?

Many definitions of SCM exist. NITL defines SCM in terms of its *Four Fundamentals*.

Fundamental 1

Firstly, the objectives of SCM are to meet or exceed the required or demanded customer service level in targeted markets/segments and to optimise total supply chain investment and cost. Customer service requirements, dictated by the market place, “set the spec” for the supply chain. Achieving this level of service at the optimal cost focuses attention on the elimination of “non value adding activities” (NVAs) throughout the supply chain.

Fundamental 2

Secondly, every product or service is delivered to the final consumer (the only source of “real” money in the chain) through a series of often complex movements between companies which comprise the complete chain. An inefficiency anywhere in the chain will result in the chain as a whole failing to achieve its true competitive potential. The phrase “supply chain” is used to indicate that the chain is only as strong as its weakest link.

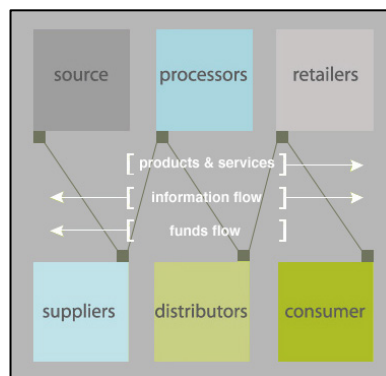


Figure 1 – The External Supply Chain

The representation in Figure 1 (above) of a “macro” supply chain shows materials flowing from raw material source through the various stages in the chain to the final consumer. Money then flows back down the chain. The key point is that every link matters and that value is added, and profit generated, at each link along the way.

Most businesses can be described in terms of the five functions buy, make, store, move and sell - known as the “micro” or internal supply chain as shown in Figure 2.



Figure 2 – The Internal Supply Chain

Traditionally these functions have been managed in isolation, often working at cross purposes. Supply Chain Management means thinking beyond the established boundaries, strengthening the linkages between the functions, and finding ways for them to pull together. A recognition that the whole is greater than the sum of the parts calls for more effective integration between purchasing and procurement (buy), production planning and control (make), warehouse management (store), transport management (move) and customer relationship management (sell), as illustrated in Figure 3.



Figure 3 – Integration in the Internal Supply Chain

Fundamental 3

For a supply chain to achieve its maximum level of effectiveness and efficiency, material flows, money flows and information flows throughout the entire chain must be managed in an integrated and holistic manner, driven by the overall service and cost objectives. It can be argued that managing the information flows is the most critical of these activities. This is because the flow or movement of materials or money is usually triggered by an associated information movement. Effective management of material and financial flows is, therefore, predicated upon the effective management of the related information flows. For this reason, information and communications technology (ICT) is becoming an increasingly important SCM enabler.

Fundamental 4

Finally, this holistic approach requires a reappraisal of the way in which both internal and external customer/supplier relationships are created and managed. SCM is not a “zero-sum” game based on adversarial relationships. Rather, it needs to be a “win-win” game based on partnership approaches. This point is relevant to the interactions between the key “internal” supply chain functions of buy, make, store, move and sell, as well as to relationships between an organisation and its external customers and suppliers.

ICT in the Supply Chain

As pointed out earlier, information and communications technology (ICT) has become a key enabler in the management of supply chains. Recent years have seen the development of a plethora of supply chain ICT applications. In broad terms these can be classified into four areas as follows.

“Point” Solutions

These are ICT applications which support the management of one link in the supply chain. At the “store” link in the supply chain warehouse management systems (WMS) aim to support the efficient management of stored goods through, for example, the optimisation of warehouse space and the factoring in of rules which maximise the shelf life of products. Wireless networks can link warehouse staff (e.g. using handheld terminals) and forklifts with real-time picking systems. In this way, orders can be filled much faster and more accurately than with manual procedures.

“Best of Breed” Solutions

This approach aims to integrate the best of a company’s existing point solutions. The main weakness of point solutions is that the various systems in use may not communicate well, may use different databases and may not have high levels of connectivity. This can result in “islands of automations” – the situation where many different applications simply do not work well together. “Middleware” companies have developed data translation technology that has enabled organisations to adopt a more integrated “best of breed” approach. In essence, this technology is software that connects two otherwise separate applications.

“Enterprise” Solutions

This approach, based on Enterprise Resource Planning (ERP), came about in the 1990s because of an organisational shift away from the traditional function-based structures towards more process-based approaches (in line with *Fundamental 2* of SCM). The phrase ERP was first coined by the Gartner Group to describe the change in computer systems from the inventory focused, transition-centric and reactive nature of ERP's predecessors – MRP (Materials Requirements Planning) and MRPII (Manufacturing Resource Planning) – to systems focused on customer service. ERP attempts to integrate all departments and functions across a company into a single computer system that can serve all those different departments' particular needs. Traditionally, each department from finance to human resource management to the warehouse had its own computer system, each optimised for the particular ways that the department does its work. But ERP combines them all together into a single, integrated software program that runs off a single database so that the various departments can more easily share information and communicate with each other.

“Extended Enterprise” Solutions

Traditional ERP is focused internally and does not easily extend beyond the boundaries of the organisation. The supply chain focus, on the other hand, extends to all supplier and customer linkages both within and outside the organisation. This conflict within ERP systems is now being addressed, on a technology level at least, through what has become known as extended enterprise solutions (“XES” or ERP II according to Gartner Group). Essentially, this refers to the collaborative sharing of information and processes between the partners along the supply chain using the technological underpinnings of ERP. It is an attempt to link the supplier’s supplier with the customer’s customer, thus facilitating higher levels of external supply chain integration.

Concluding Comments

Rapid developments in ICT are now occurring. The correct implementation of this technology has the potential to enhance supply chain capability and business competitiveness. However, to realise the maximum benefits from technology it should not be implemented in isolation, but rather as part of an integrated approach to SCM. The proliferation of sophisticated ICT solutions has led to investment decisions becoming a complex choice between the various approaches outlined earlier. Even more challenging is the realisation that most ICT solutions are no longer likely to provide strategic advantage, but simply the business basics. The competitive advantage for companies will originate from developing creative ICT strategies and implementing them superbly.

NITL is Ireland’s Centre of Excellence in SCM. The Institute offers a range of SCM services including advice and consultancy, research and training and education. Courses are run on a part-time modular basis allowing for maximum flexibility and a work-life balance. NITL’s Annual Conference takes place on October 6th 2005 in Croke Park, Dublin. The conference will feature a series of presentations and case studies that will highlight the benefits of SCM.