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Integrating the Supply Chain

by Graham C. Stevens

The Scope of the Supply Chain

The role of manufacturing industry is to create wealth by adding value and selling products. Common to all manufacturing companies is the need to control the flow of material from suppliers, through the value adding processes and distribution channels, to customers. The supply chain, as shown in Figure 1, is the connected series of activities which is concerned with planning, coordinating and controlling material, parts and finished goods from suppliers to the customer. It is concerned with two distinct flows through the organisation: material and information. The scope of the supply chain begins with the source of supply and ends at the point of consumption. It extends much further than simply a concern with the physical movement of material and is just as much concerned with supplier management, purchasing, materials management, manufacturing management, facilities planning, customer service and information flow as with transport and physical distribution.

The objective of managing the supply chain is to synchronise the requirements of the customer with the flow of material from suppliers in order to effect a balance between what are often seen as the conflicting goals of high customer service, low inventory investment and low unit cost. The design and operation of an effective supply chain is of fundamental importance to every company.

It is important to understand that customer service encompasses all the points of contact between the customer and the supplier in terms of fulfilment of orders, and includes delivery service, pre- and post-sales services, technical support, financial packages and so forth. Customer service is the output from the supply system and it results from the combined effect of all functions along the supply chain. The activities carried out by all functions are important in establishing a desired level of customer service performance. They are also interdependent; if one activity fails, the chain is disrupted, creating poor performance and destabilising the workload in other areas, thereby jeopardising the effectiveness of the supply chain.

To provide higher service level will, without incurring an undue burden of cost, require that all the activities along the supply chain are in balance. To achieve the necessary balance between cost and service involves trade-offs through the chain (see Figure 2). For the benefit of such trade-offs to be fully achieved it is necessary to think in terms of a single integrated chain rather than narrow functional areas. Unfortunately, the functional attitudes and goals in most companies are in conflict and hinder integration along the supply chain. The traditional approach to managing these conflicts has been to concentrate at the operational and planning levels and compensate for the imbalance with excess inventory and capacity. The results of this approach have for some companies, at best, been frustrating and expensive, at worst, disastrous. To resolve these conflicts effectively and turn the supply chain into a weapon for gaining competitive advantage requires the development of an integrated supply chain driven by the needs of the business.
The Development of an Integrated Supply Chain

The development of an integrated supply chain requires the management of material flow to be viewed from three perspectives; strategic, tactical and operational. At each level the use of facilities, people, finance and systems must be co-ordinated and harmonised as a whole (see Figure 3).

**Strategic Perspective**

While businesses often spend a lot of time and thought on strategic issues in the area of manufacturing, finance and marketing, the focus on supply is rarely strategic, it tends primarily to be operational. If supply issues are disregarded, such that the supply chain is excluded from the strategic debate, there is imbalance, exploitable opportunities are missed and the impact of the competitive threat increased.

The focus at the strategic level should be to develop:

- objectives and policies for the supply chain. These should be expressed in terms of what the supply chain has to do well (be responsive to change, operate at lowest cost, ensure a high level of product availability etc) to support the needs of the business;
- the shape of the supply chain in terms of key facilities and their locations;
- the company’s competitive package, planned by product and market segment, detailing the balance between product availability, service level, lead time, technical support and after sales support;
- an outline organisation structure able to bridge functional barriers and operate an integrated supply chain effectively.

**Tactical Perspective**

The tactical perspective should focus on the means by which the strategic objectives can be realised. It involves translating the strategic objectives and policies into complementary goals and objectives for each function to provide balance to the supply chain. The functional goals provide the drivers for achieving the balance and inventory, capacity and service are the levers by which balance is achieved. Additionally, the tactical dimension involves determining the tools, approaches and resources necessary to deliver the “do well”, in particular the most appropriate mix of systems (MRPII, DRP, JIT etc.) necessary to manage the supply chain and provide the information infrastructure.

**Operational Perspective**

The operational perspective should be concerned with the efficient operation of the supply chain. It focuses on the detailed systems and procedures and ensures that appropriate controls and performance measures are in place. Typically, a company should measure the performance of the supply chain in terms of inventory investment, service level, throughput efficiency, supplier performance and cost.

This vertical dimension linking the strategic, tactical and operational perspectives is key to effective organisation development because it provides a framework which
precludes the need to consider centralised or decentralised supply chain control as exclusive structures. It provides the flexibility to centralise the strategic, decentralise the operational where practical, and tune the tactical decision making according to the organisational requirements of the particular company.

**Systematic Approach for the Development of an Integrated Supply Chain Strategy**

In the context of the supply chain, companies are having to face up and respond to a number of issues, including:

- the high cost of supply chain activities (estimated to be between five and 20 per cent of net sales value);
- the level of inventory (typically, stock levels are between three and five months’ usage);
- poor customer service (in terms of lead time, availability, reliability, documentation and responsiveness);
- inter-departmental conflicts;
- goal restructuring.

If a company is to respond to these issues and develop an integrated supply chain strategy, it must be done by close interaction of all business areas and not on an *ad hoc* basis. To ensure success a structured approach is required. Developing an integrated supply chain strategy can be considered as a three phase process (see Figure 4).

**Phase I: Competitive Environment Evaluation**

The first step is to look outward. The objective is to develop and document the characteristics of the marketplace. The reason for this evaluation is to focus and direct the total strategy development effort to where it can be applied to best effect. Too often when companies want to evaluate the supply chain it is done either at the whim of the individual involved or it just focuses on areas where the company has had success in the past. This narrow approach is invariably ineffective. The way to evaluate operations and to develop a supply chain strategy is to determine those areas where the marketplace demands that a company must be competitive. Therefore, it is necessary to evaluate the market. By doing this it also provides a framework for the evaluation of alternative solutions which can be developed later.

The process used to evaluate market characteristics involves looking at and surveying vendors, customers and competitors in order to determine the needs of the customer and the pressures which the vendors, customers and competitors can apply in a particular situation. In effect, what is being identified is, “what do the customers want?”, and “how much weight do they have in the market to get what they desire?”. The output from this work is a list for each product of the market characteristics which can then be weighted in order of importance.

The purpose of the second step is to review and summarise concisely the company’s existing strategies. The reason for this is not to evaluate the sophistication or the appropriateness of particular strategies but to focus and direct the supply chain development effort. The purpose is simply to identify the internal constraints which may impact on the development of a supply chain strategy.

The third step is to determine the order winning criteria, the object being to define, prioritise and eventually weight the customers’ critical purchasing factors. To do this, it is necessary to combine the internal and external factors which have been identified and develop a single, prioritised list for each product market segment, such that effort can be concentrated on areas of importance. This approach also provides a clear framework which can be used to determine which techniques and strategic elements are most important to the company.

**Phase II: Supply Chain Diagnostic Review**

Once the order-winning criteria have been defined, the next step is to review the supply chain operations and to identify those areas which offer potential for improvement. The first step is usually to develop a cost model. This is necessary because in many companies the traditional cost accounting and measurement systems do not effectively distribute the costs of the activities in the organisations to individual products or market segments. In fact, they are invariably not even presented in a way which enables the costs of particular activities to be clearly defined. The objective of this step, therefore, is to develop a realistic method of allocating overhead costs to products, markets and activities.
At the same time as developing the cost model, effort should be directed towards identifying those activities in the company which mostly affect and impact on the ability to meet customers' needs. That is, identify what the company has to "do well". The objective is to identify those activities in the company operations which can significantly impact on the company's ability to satisfy customer needs. Again, allow effort to be focused only on those activities which have an impact and provide improvement opportunities.

The last step in Phase II is to develop a list of potential improvement techniques for each of the opportunities which have been identified. This list is not intended to be a strategy or even a recommendation of improvement techniques, but the first step towards identifying techniques for consideration in developing a supply chain strategy and a final implementation plan.

**Phase III: Supply Chain Development**

The final phase is the development of a supply chain strategy and tactical plan for implementing that strategy. The objective here is to develop a strategy for the company, based on the work done in the first two phases which is consistent with customer desires, management focus, market characteristics and the realities of the organisation. This strategy should utilise fully the company operations and competitive tools, and allow an approach to supply chain improvements which is integrated with the rest of the business.

The final task is to reduce the supply chain strategy to actionable implementation plans by developing specific, time-phased, tactical plans for implementing the strategy. This involves organising and prioritising the list of potential improvements, developed in an earlier task, to reflect the strategic plans which have now been developed. The result of this task is a set of time-phased action plans for implementing the supply chain strategy.

**Achieving an Integrated Supply Chain**

Although a detailed top down approach to developing an integrated supply chain strategy is essential, its successful achievement is likely to be bottom up, evolving through a number of stages (see Figure 5).

Stage 1 ("base line") is typified by the company that vests responsibility for different activities in the supply chain in separate, almost independent, departments. Even in relatively small concerns the "base line" supply chain is fragmented and characterised by:

- staged inventories caused by failure to integrate and synchronise activities;
- independent and often incompatible control systems and procedures covering sales, manufacturing, planning, material control, purchasing, etc;
- organisational boundaries, whereby purchasing might control the incoming material flow to raw material stocks. Manufacturing and production control would cover raw material through capacities and in-process inventories to finished goods. Further along the chain, sales and distribution divide the outward supply chain and inventories.

In Stage 1, company planning is very short term — to the point where it is almost reactive; very much based on the quick fix, lurching from crisis to crisis.

This situation gives rise not only to inefficiencies within the operation of the supply chain, but it puts in jeopardy the overall effectiveness of the supply chain as well as increasing the company's vulnerability to the effects of changes in supply and demand patterns.

The next stage of development involves functional integration which focuses principally on the inward flow of goods. This level of integration is characterised by:
• emphasis on cost reduction rather than performance improvement;
• discrete business functions, each of which is buffered by inventory;
• elements of internal trade-off between, for example, purchase discount and the level of inventory investment, high plant utilisation and batch sizing;
• customer service tends still to be reactive, in other words, the customer who shouts the loudest gets the goods.

With regard to planning and control systems, Stage 2 companies typically apply time phased planning to the materials and manufacturing management areas using MRP or MRPII techniques. Within the distribution network, demand will continue to be aggregated. In effect, orders are still being thrown over the wall to manufacturing, such that for planning purposes the distribution infrastructure is effectively decoupled from manufacturing. As a result, there is poor visibility of real customer demand which leads to inadequate planning and generally poor performance.
The third stage of development recognises that there is very little point in just focusing on the flow of goods into the organisation unless the flow is well managed on the way to the customer. This stage involves the integration of those aspects of the supply chain directly under the control of the company and embraces outward goods management, integrating supply and demand along the company's own chain. Internal integration is characterised by a comprehensive integrated planning and control system. Typically, Stage 3 companies will use DRP systems, integrated via well-managed master schedules to an MRPII system for materials management — using, where practical, JIT manufacturing techniques to support the execution of the material plan.

When a company has achieved such a level of integration, it can truly begin to talk of synchronised demand management — synchronising the demand from the customer with the manufacturing plan with the flow of material from suppliers to reap substantial benefits by substituting information for inventory.

Stage 3 supply chains are characterised by:

- full systems visibility from distribution through to purchasing;
- medium-term planning;
- the focus on tactical rather than strategic issues;
- an emphasis on efficiency rather than effectiveness — ensuring what is done is done well, rather than ensuring that the right thing is done;
- extensive use of electronic data interchange to support the customer link and facilitate a faster response,
- reacting to customer demand rather than "managing" the customer.

It is not until Stage 4 that full supply chain integration is achieved by extending the scope of integration outside the company to embrace suppliers and customers.

The significance of this development goes beyond just scale alone. It embodies a change of focus; away from being product-orientated to being customer-orientated, penetrating deep into the customer organisation to understand the products, culture, market and organisation. This should ensure that the company is attuned to the customer's needs and requirements.

Integration back down the supply chain to include suppliers also represents more than just a change of scope — it represents a change in attitude, away from the adversarial attitude of conflict to one of mutual support and co-operation. Co-operation starts at the early stages of product development and encompasses full management involvement at all levels; the supply of high quality products shipped direct to the line on-time; shared product, process and specification change information; technology exchange and design support, and above all, long-term commitment, which usually means the elimination of multiple sourcing.

Summary

Common to all manufacturing companies, regardless of size, type of product or manufacturing process is the need to control the flow of material from suppliers, through manufacturing and distribution to the customer. Traditionally, the flow of material has been considered only at an operational level, at best driven by efficiency improvement and cost reduction, at worst abandoned to be battered by the demands of a rapidly changing competitive environment.

For many companies the need to react to market changes is paramount; the role of the supply chain is crucial. No longer can the potential of integrating the supply chain be ignored. This potential will, however, only be realised by recognising the connections and inter-relationships between component parts of the supply chain and ensuring a good fit between its design and operation and the company’s competitive strategy. Those companies that consider the supply chain during the strategic debate, manage it as a single entity and ensure the appropriate use of tools and techniques in order to meet the needs of the market, will obtain real benefits resulting from the double-edged impact of increased market share on a lower asset base. Those that do not will get left behind in the fight for survival.

Further Reading


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