Evolution to World-Class Inventory Management

Advancing from Inventory Optimization to Sales, Inventory & Operations Planning and Beyond to Supply Chain-Oriented Product Development, and SKU and Supplier Rationalization

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Introduction

The evolution from elementary to world-class inventory management is one of progressive organizational maturity and management focus. More specifically, the progression is from within a planning department to multi-functional management that involves internal groups as well as customers and suppliers, usually with significant need for change management support.

This white paper provides an overview of the growth process toward world-class inventory management – from the theoretical and technical approaches undertaken within small planning groups to the multi-disciplinary, management, strategy-oriented approaches of fully evolved organizations. Originally called Sales & Operations Planning (S&OP), the term "Sales, Inventory & Operations Planning (SIOP)" is used throughout this paper to reflect the fact that organizations are increasingly embracing this forward- thinking concept.

While some level of functioning exists simultaneously in inventory optimization, SIOP, and supply chain-oriented product development, managing inventory in a world-class manner within most companies proceeds somewhat sequentially through the evolution of the following phases:

- **Inventory Optimization**, in which textbook approaches to scientific inventory management are applied;

- **Sales, Inventory & Operations Planning**, in which conflicts in priorities are

addressed formally and solid, timely decision-making processes are developed; and

- **Supply Chain-Oriented Product Development**, in which the product development process is specifically oriented to operations and the supply chain capabilities are leveraged.

At every stage, the twin goals are the same; the difference lies in the breadth of the approach and the range of groups involved.

The customer service goal is simply stated: Product where it is needed, when it is needed, in the appropriate quantities, and in the required state. The obverse is also obvious: No other product, anywhere. The financial goal is also simply stated: Achievement of the economically-optimum level of product availability for customer service with the minimum cash investment in working capital and the lowest period costs for acquiring and holding the inventory.

If only the evolution to world-class inventory management were as simple as the goals and objectives. In reality, world-class inventory management requires the cost-effective integration of people/organization, business processes and enabling technologies – all aligned with the firm's business and operating strategies

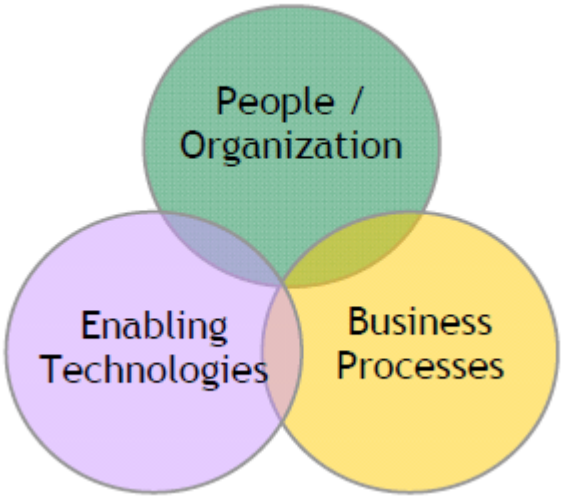

Figure 1. Required Support for World- Class Inventory Management

The Fundamentals: Inventory Optimization

The most basic form of **inventory management** only requires answers to three questions for each SKU location:

1. To what extent is it appropriate to be out of stock and, accordingly, what forecasting process and safety stock levels are required to provide that level of customer service?

2. Under what circumstances should product be acquired (manufactured or purchased) to inventory, to customer order or to something in between?

3. If cycle stock is to be acquired to inventory, how much should be ordered and how often?

Likewise, the most basic form of **inventory control** only requires answers to two questions:

1. How can permanent records of on-hand inventory balances be accurately synchronized with actual on-hand quantities?

2. How can loss and obsolescence be minimized?

Albeit with little or no financial or customer service success, the basic inventory management issues can be addressed in simplistic spreadsheet form with these elements:

- Moving average forecast rates of sale per period with no editing capability;

- No editing of past or recognition of future promotion demand;

- Static lead times with limited validity;

- Rules of thumb, such as fixed values or arbitrary periods of supply, for safety stock levels and order quantities;

- No override or round-off capability; and

- The need to hunt for SKUs needing replenishment.

On the more sophisticated end of the spectrum, inventory management issues can be addressed more scientifically with these elements:

- State-of-the-art forecasting software based on consolidated ultimate consumer point-of-sale (POS) data from all markets, with past promotions automatically accounted for in the sales history;

- A database of past promotion sales lifts, characterized by duration, price discount, if any, and relative degree of advertising, for use in projecting future promotion demand;

- Dynamic lead times;

- Statistics-driven dynamic safety stock levels based on forecast error, demand variability and/or lead time variability for multiple-parameter-ranked SKUs and their classes' desired customer service levels with override capability;

- Economics- or fixed order period-based order quantities with both override and round-off capability; and

- Replenishment software prioritizing SKUs that potentially need to be re-forecast, purchased, grouped for joint replenishment and edited as required to meet minimum order quantities (MOQs) based on forecast out-of-stock date.

Further, application of technology can support a number of other strategic and tactical inventory issues, including:

- When it is economically appropriate to transfer (overstock) inventory from one location to another within the same tier to prevent the need to acquire more;

- When it is economically appropriate to transfer inventory from a location in one tier to a location in an upstream tier through reverse logistics to reduce overstock, or to a location in a downstream tier to support demand and customer service requirements;

- When components need to be kitted or assembled;

- When inventory needs to be pre-built to avoid future capacity issues; and

- Where SKUs should be stocked to minimize working capital, transportation costs and inventory holding costs, and the path which they should follow to reach that location.

As technically-oriented as inventory optimization appears, it cannot begin to address numerous other issues that impact inventory performance. Some of these elusive issues are examined in the coming pages.

Advanced Decision-making: SIOP

During or shortly after the evolution toward solid policies and business processes, it becomes obvious that there are issues which inventory optimization cannot address. When inventory is purchased, the issues that arise generally concern inventory not being where it needs to be when it needs to be and in adequate quantity. When inventory is manufactured internally, the conflicts can be of the same variety but can also be due to manufacturing capacity or priority issues.

In either case, these challenges stem from a number of real-world phenomena such as:

a. Longer-than-planned lead times;

b. Smaller-than-anticipated receipts;

c. Higher-than-forecast sales;

d. Sooner-than-expected due dates;

e. Changes in required product state (painted/unpainted, assembled/unassembled, etc.);

f. Delays of myriad types; and

g. Mistakes, miscommunications and misunderstandings.

These phenomena cross organizational boundaries and generally bring three groups (two for firms which purchase as opposed to manufacture internally) into the discussions – planning, sales and manufacturing. In turn, each of these groups has its own appropriate priorities:

1. **Planning:** To maximize inventory performance in both the financial and customer service areas (*If we don't handle these inventory replenishment orders, we're going to have customer service issues later.)*

2. **Sales:** To maximize sales and ensure that commitments to customers are met *(We need to acquire the product to ship these orders.)*

3. **Manufacturing:** To manufacture quality product at the lowest cost *(We are running what was planned, don't have any uncommitted capacity and will incur additional costs if we interrupt the runs for any unplanned changeovers.)*

Even when all groups are perfectly aligned with the firm's overall goals, conflicts occur because of the differences in objectives. Historically, and unfortunately all too common in many organizations, these issues are typically addressed with anxious e-mails, hallway conversations and frantic decision-making, not to mention frustration, anger and embarrassment, and, in some instances, finger-pointing and accusations.

In its most basic form, SIOP was developed to address these types of situations; however, it is impractical to do so at the SKU or transaction level. Accordingly, SIOP provides a structured business process which facilitates addressing problems at the product family or group level ahead of time whenever possible (See *Figure 2.)*

In a broader sense, SIOP provides a forum for addressing inventory management issues that deserve cross-functional management consideration. These key issues are:

- To what extent should SKUs be managed differently for strategic market penetration or other reasons?

- How should limited inventory (or manufacturing capacity) be prioritized for different customers?

- When is increasing lead time to facilitate lower transportation costs, with the associated increase in inventory, appropriate?

- How should inventory be valued?

- What initial acquisition quantities for new SKUs are most reasonable?

- When should a SKU or related group of SKUs be discontinued?

- What sales lifts are anticipated for upcoming promotions?

- To what extent should VMI (vendor managed inventory), VSP (vendor stocking programs), consignment, take or pay, payment term discounts and other techniques be used to improve profit?

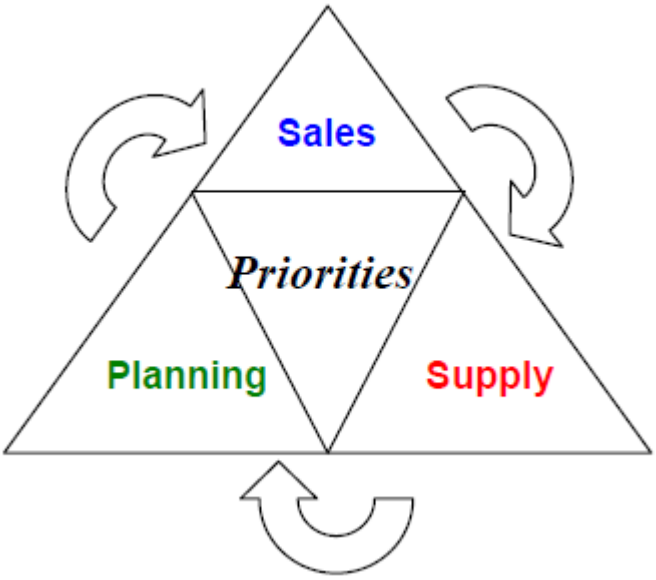

Figure 2. Sales, Inventory & Operations Planning

Such issues are well beyond the scope of inventory optimization, no matter how well done. But SIOP provides a mature, balanced structure for addressing them responsibly.

Product Development and Supplier Rationalization: Impacts on World-Class Inventory Management

Product development can be supportive of good supply chain performance or can create inordinate difficulties, some of which can be addressed at the last minute by incurring air freight costs. As inventory management evolves through a number of stages, so too does the support which product development can provide to supply chains.

Foremost is the time actually allowed for sourcing, acquisition and transportation. In most instances, adequate time is planned, but if predecessor functions run late and the launch dates remain unchanged, supply chain execution becomes, at a minimum, more expensive and, in some cases, humanly impossible. For example, it would be impossible to have back-to-school products launch in mid-October.

When the schedule is tight, compromises must be made by shortening variables such as the time needed for obtaining lowest landed raw material unit costs. In addition, the time may need to be trimmed for adequate investigation of a sub-contractor’s capabilities to avoid product re-design and scrapped parts, as well as for a sub-contractor’s capacity to avoid

long lead times and secondary sourcing. Other considerations in this area include the time needed for tooling development to reduce manufacturing costs and the period for test marketing and refining new SKU forecasts to avoid overstock.

The other way in which product development can support or interfere with good supply chain performance is more subtle and potentially more arduous – the issue of manufacturability. Unfortunately, just because a product can be made on a one-off basis, this has little or no relation to whether or not it can be manufactured in quantity at an acceptable unit cost. Yet experience, use of proven processes, use of trusted resources and equipment, prototypes, and numerous other development techniques can reduce but not entirely eliminate the risk. This is especially true when multiple countries of origin are involved or when the manufacturing processes themselves are developmental.

Unfortunately, there are no guarantees of success – the only mitigation is continual diligence and communication in checking and testing.

The third and most powerful impetus for facilitating supply chain performance in the long term is component standardization and modularity, along with SKU rationalization. Use of existing raw materials; use of common component parts; designing to facilitate manufacturing to semi-finished inventory and completing to order; and increasing tolerances and rationalizing SKUs as they reach the end of their economic life all serve to leverage supply chain performance. Such approaches impact supply chain performance in terms of:

- Increasing consumption of individual items reducing unit cost and inventory value;
- Minimizing SKU proliferation;
- Reducing lead times; and
- Minimizing SKU obsolescence issues.

Above and beyond VMI, VSP, consignment and the other procurement-related techniques noted above, supplier rationalization can also impact inventory performance, especially in the financial area. Using multiple suppliers for the same products may minimize risk and provide an element of competitiveness; however, at the same time, there are real extra costs. Specifically, minimum order quantities (MOQs) are likely to be incurred or increased and unit price break points cannot be used as effectively due to the reduced volume. Further, inbound transportation costs are increased, sometimes dramatically, due to the reduced shipment sizes.

With fewer suppliers – whether for the same products or, in the case of distributors, for

groups of products from multiple manufacturers – all of the advantages, except possibly competitiveness for items whose costs can't be baselined from external sources, can be realized.

From a management standpoint, achieving integration of product development and supply chain planning and execution functions may prove challenging. Product development is not simple in the best of circumstances. The best performing supply chains for new or re-developed products involve supply chain personnel throughout the product development process, from concept through launch.

Likewise, achieving integration of procurement and supply chain planning functions can be problematical. Their differences in perspective (usually based on the relative importance of unit costs, even landed, as opposed to total supply chain costs) can best be addressed by ensuring that all of the objectives are aligned. For instance, procurement personnel tend to want the lowest unit cost. But this is often not the lowest total cost, as it comes with strings attached which can increase inventory value. Planning personnel tend to want low inventory values. Overall, the best organizations want lowest total cost, but it can be hard to quantify.

Conclusion: Instrument of Competitive Advantage

Unfortunately, many company inventories – some literally valued at hundreds of millions of dollars – are far off the mark when it comes to world-class inventory management. In these organizations, inventory management not only fails to support the achievement of corporate goals, it undermines other worthwhile efforts and impedes improvement.

The achievement and continued sustaining of world-class inventory management – maximizing performance in both the financial and customer service arenas – requires experience, vision, commitment, management skill and perseverance. At a minimum, world-class inventory management can be supportive of corporate goals and objectives, minimize cost, and maximize customer service. At best, it can become a powerful instrument of competitive advantage.

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About Tompkins Associates

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