Abstract. Complexity and inefficiency have overtaken a vast majority of manufacturers’ supply chains – particularly those of large companies striving to be global players. When ineffectively managed, the supply chain is robbing manufacturers of profits, market position, growth and return on assets – rendering them less competitive.

Yet, what most companies and industry analysts fail to realize is that “big and complex” can prove to be more profitable than “small and simple”. Indeed, a small number of global manufacturers – which we have named “Complexity Masters” - have successfully mastered the phenomenon of increasing supply chain complexity and have reaped the benefits of healthy profits, shareholder returns, market share growth, increased revenue and return on capital investment. In fact, our research shows the profit margins of these innovative “Complexity Masters” to be 73 percent greater than those manufacturers with far simpler supply chains. Thus, there is a clear, proven connection between the ability to manage supply chain complexity and overall profitability. These Complexity Masters have turned the supply chain into their primary value chain.

This presentation at ISM will share strategies, operational practices, technologies and key initiatives behind these innovative “Complexity Masters.” This group of elite companies has grappled with and mastered the complex issues around a diversified supply chain, while many others have gambled and lost.

Important Study on Global Supply Chains
Deloitte recently completed (or sponsored?) one of the largest global manufacturing benchmarking initiatives, entitled “Mastering Complexity in Global Manufacturing: Powering Profits and Growth Through Value Chain Synchronization.” The study analyzed the supply chain synchronization of nearly 600 manufacturers in every major industry segment across North America and Europe – representing 19 countries. Industries represented in the study include aerospace and defense, automotive, life sciences, manufactured consumer products, process and chemicals, high technology and telecommunications, as well as other general manufacturing segments such as metal fabrication, industrial machinery and equipment.

Deloitte’s study was designed to address the intense competitive pressures on manufacturers, uncover solutions that manufacturers are using to maximize their global supply chain and understand the trends and issues in the global manufacturing market.
Three Key Forces
Manufacturers’ supply chains are growing enormously complex. With sourcing, manufacturing, engineering and distribution operations spread increasingly across the globe, shorter product life cycles and ever-increasing customer demands, companies large and small have found it ever more difficult to synchronize the pieces.

Deloitte’s research points to three main forces that pull apart manufacturers’ supply chains and make them more complex to manage:

- The unrelenting pressure to continually drive down costs, from product concept to delivery
- The pursuit of new lucrative markets and channels
- The quickening pace of product innovation

All three of these forces directly affect the supply chain strategies of manufacturers, as well as the tactical actions.

Each decision within these areas has a high impact on the profitability and productivity of the global supply chain – creating a trend of ever-increasing complexity that challenges supply chain managers.

Paradoxes in the Supply Chain
Deloitte’s research uncovered several disconnects between the manufacturers’ stated priorities and their actual behavior and activities within the global supply chain. Deloitte’s study refers to this as the “Paradoxes of Complexity.” These contradictions became obvious from analysis of the study data. However, they are not always as easy to discern in the actual day-to-day manufacturing process. Specifically, the study found that poor performing manufacturers struggle to harmonize their priorities with their actions in these key areas:

- **Optimization Paradox:** Despite potentially huge revenues from designing supply chains with a global, holistic view, most manufacturers continue to focus on optimizing locally. Only half of manufacturers report that a single executive is in charge of end-to-end supply chain operations within the company (or business unit). This locally driven management model typically limits the scope of performance improvements to the functional boundaries of the executive in charge – resulting in a view from within their “four walls.”

- **Customer Collaboration Paradox:** Only half of the manufacturers studied engage in some form of customer-collaboration, and less than 10 percent have substantive collaborative initiatives in place. Yet nearly nine out of ten companies that have made an effort to collaborate with customers, report significant benefits from doing so. It appears that most companies prefer, instead, to focus on their suppliers, which typically are much easier to deal with than the customers.
• **Innovation Paradox:** Despite recognizing the linkage between revenue growth and product innovation, most manufacturers are not prepared for the accelerating pace of product introductions. While respondents rank product innovation and time-to-market as their number one strategic priority at the enterprise level, they rank it as their least important supply chain priority. In fact, 57 percent have no formal product lifecycle methodology; nearly one third do not use common parts, sub-assemblies, or product platforms; and nearly 75 percent do not use product lifecycle management software. All of these deficiencies are obstacles to effective innovation.

• **Flexibility Paradox:** Manufacturers say that flexibility is a key priority. However, as a whole, they are becoming increasingly inflexible in the pursuit of direct product cost reductions. By outsourcing production, engineering, or logistics to third parties or to distant locales, they can end up lengthening lead times, increasing risk, reducing flexibility, and otherwise hindering their ability to quickly shift supply chain operations. All of this increases their exposure to imbalances in supply and demand.

• **Risk Paradox:** Most survey respondents rank product quality as their top supply chain priority. Yet the global dispersion of the supply chain activities greatly increases the risk of undercutting quality, whether it is through sourcing components from low-cost locations, or moving production to low-cost venues. Nevertheless, almost all (96 percent) respondents say their product quality capabilities are equal or superior to those of their primary competitors.

This gulf between stated priorities and actions across the supply chain is jeopardizing the success and profitability of manufacturers everywhere and at all levels.

**Supply Chain Complexity is Impacting Financial Performance**

Every manufacturer’s supply chain, regardless of size, is the foundation for the company’s planning, sourcing, production, sales, and financial success. Manage it well and drive velocity and profitability. Manage it poorly and watch as profits erode, shareholder value shrinks, and market position declines.

Far too many manufacturers are missing out on the profits of managing the supply chain and are rapidly losing money. In fact, more than a third (38 percent) of the 600 respondents to the Deloitte survey have slim (less than 5 percent) operating margins or are losing money on an operating basis. Additionally, the Deloitte study found:

- In the last year, 33 percent of manufacturers failed to achieve their goals for return on capital/assets; nearly 35 percent missed their goals for return to shareholders; and 35 percent missed their profitability targets.
- 40 percent fell short of their revenue goals.
- More than half of the 1,000 largest global manufacturers in the world (51 percent) generated profits that did not meet their cost of capital.

To be sure, manufacturers are not sitting still and letting supply chain inefficiencies overrun them. They are diligently trying to ensure that their operational performance keeps up with
mounting supply chain complexity. However, their efforts are often in vain, only compounding the problems of complexity and poor financial performance.

**The Performance Advantage of Complexity Masters**

To enjoy financial success, manufacturers clearly need to adopt the profitability strategies of the Complexity Masters, while avoiding the common mistakes that so often frustrate progress. There is an obvious, proven connection between the ability to manage the complex supply chain and to achieve overall profitability. Complexity Masters (only 7 percent of the companies surveyed) have turned the supply chain into their primary value chain, which has resulted in profit margins that are 73 percent greater than those manufacturers with far simpler supply chains.

**The Strategies of Complexity Masters**

The ability to manage global value chain complexity in a profitable way comes down to two key factors:

- **Mastering Within The Organization**: excellent customer, product, and supply chain-related business processes
- **Mastering Across Multiple Organizations**: excellent synchronization of those processes across the organization and its customers and suppliers.

**Synchronization Framework**

1. Supply chain network and assets optimized based upon business strategy
2. Global supply chain organization
3. Synchronizing efforts across customers, products, and the supply chain
4. Foundational ERP with decision support tools layered on
5. Working capital integral part of supply chain design and management
6. Flexibility / responsiveness designed into supply chain network
7. Integrated supply chain planning extends to customer / suppliers
8. Integrated product development process
9. Robust metrics and measurement capability / conflicts resolved
10. Supply chain collaboration environment

**The Fundamentals of Mastering Complexity**
The Top Three Differentiators of Complexity Masters

Complexity Masters are differentiated by their focus on certain internal initiatives and importantly on synchronizing across the supply chain, specifically:

1. *Customers* – collaborating with their customers, rather than only with their suppliers. Undertaking customer profiling, customer loyalty and customer segmentation initiatives.

2. *Products* – increasing performance through managing products and introducing new products. Managing mass customization of parts; reducing cycle time; improving time to market.

3. *Technology* – implementation across customer, product and supply chain operations, including Product Lifecycle Management (PLM) and Advanced Planning Systems (APS) that focus on long-term planning and forecasting, in addition to more tactical technology, including warehousing management systems (WMS) and transportation management systems (TMS).

Conclusion

Cost pressure, market expansion and new product innovation are driving manufacturers to take aggressive actions to improve supply chain performance, often fragmenting the supply chain and leading to increased complexity.

Understanding, leveraging, and profiting from supply chain complexity is fast becoming the new battleground for manufacturers everywhere. The “Complexity Masters” have mastered the strategies to resolve the paradoxes and optimize supply chain performance, while simultaneously creating a sustainable competitive advantage.

There is a roadmap for building supply chain capability and creating value. Learning from Complexity Masters is a valuable first step for all manufacturers – from small, fast-growing business units to multi-divisional, global operations – as they continue their quest for growth and profitability.

REFERENCES

**Book References**

Juliet / Rick, please provide.

**Web Site References**


[www.deloitte.com/globalbenchmarking](http://www.deloitte.com/globalbenchmarking)