

Building a World-Class Supply Chain

New Insights from Electronics Manufacturers

Next Generation Manufacturing Study

The MPI Group

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Building a World-Class Supply Chain

Introduction

Electronics manufacturers manage some of the most complex supply chains imaginable, pulling together materials and components from a vast array of suppliers that often stretch around the globe. These firms are pressured by consumers who increasingly demand more — more value and more innovation at increasingly lower prices. To satisfy this demand, electronics firms must swiftly design products, procure supplies, and manufacture and ship finished products within narrow market windows.

Any delays in introducing and delivering products, such as incompliant materials or production defects, force customers to competitors' goods and erode profits for products with limited shelf-lives. Researchers Kevin B. Hendricks and Vinod R. Singhal studied 450 publicly traded companies and found that product delays have a statistically significant negative impact on profitability — a median decline in return on assets ranging from 2.7 percent to 3.4 percent over a three-year period around the year when a product delay is announced. The median decline in sales over assets ranges from 5.9 percent to nearly 11 percent, and the median decline in return on sales ranges from 1.5 percent to 3 percent.¹

Suppliers to electronics manufacturers are critical allies in the struggle to get to market and satisfy demand, making supply-chain management and collaboration a core strategy for electronics manufacturers. In order to effectively compete today and into the next generation, electronics manufacturers must rethink the ways in which they manage their supply chains and develop characteristics of world-class supply-chain management.

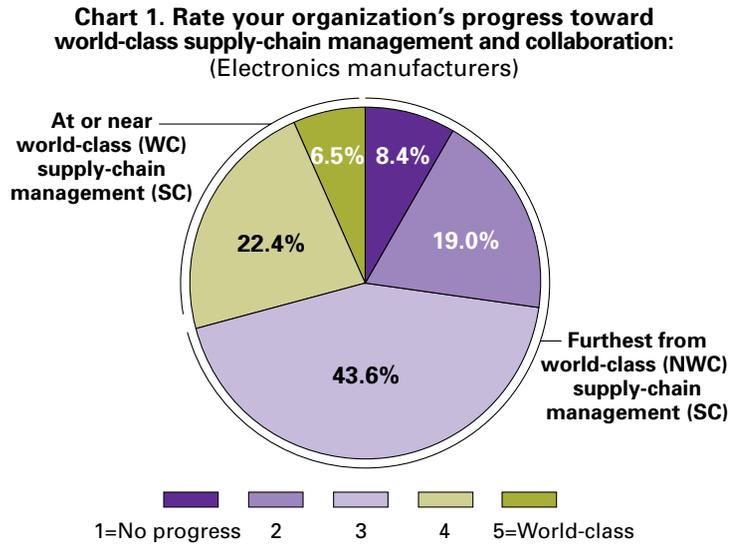
The Next Generation Manufacturing (NGM) Study is one of the largest studies ever on future directions in manufacturing, assessing more than 2,500 manufacturers against six key strategies for success including supply-chain management and collaboration. World-class supply-chain management and collaboration is defined in the NGM Study as “developing and managing supply chains and partnerships that provide flexibility, response time, and delivery performance that exceed the competition.” NGM Study supply-chain data for electronics manufacturers is the basis for this report.² To reach a world-class level of supply-chain performance, electronics manufacturers must focus on three key objectives:

- Recognize that “supply-chain management and collaboration” is a core strategy, and that achieving world-class performance improves both productivity and customer satisfaction. Surprisingly, many manufacturers are not interested in working closer with their supply-chain partners and developing collaborative relationships.
- Support supply-chain management and collaboration with resources, investments, and best practices: Despite good intentions and awareness of the benefits of supply-chain management and collaboration, many firms fail to support this objective with people and tools that enable their companies to execute and improve.
- Rigorously monitor performance to continuously improve visibility into supplier and customer relations and to optimize supplier networks: Many companies react to problems after they arise, lacking systems that support predictability while giving them the ability to monitor and improve their returns from supply-chain management and collaboration.

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World-Class Supply Chains Outperform Competitors

Few electronics manufacturers have achieved world-class supply-chain management and collaboration. According to the NGM Study, just 7 percent of electronics firms report themselves at a “world-class” level for supply-chain management and collaboration, and only another 22 percent believe themselves near world-class status (*Table 1*). More than one-quarter of electronics manufacturers have made little or “no progress” toward world-class supply-chain status. The tables throughout this report examine how two groups — electronics manufacturers at or near world-class supply-chain management and collaboration versus those furthest from world-class status — exhibit vastly different supply-chain practices and performances.



The ability of electronics manufacturers to attain superior performance with their supply-chain strategies correlates to the importance they place upon the strategy: Less than half of electronics manufacturers (42 percent) indicate that supply-chain management and collaboration is “highly important” to their organization’s success over the next five years (*Table 2*). But even many firms that understand the strategy’s importance are still unable to attain world-class status due to an inability to execute (e.g., lack of best practices, tools or resources).

Especially interesting is the “importance gap” between electronics manufacturers at or near world-class supply-chain management compared to those furthest from world-class status: Among electronics manufacturers at or near world-class supply-chain management and collaboration, 63 percent rate the strategy as highly important, compared to only 34 percent of electronics manufacturers furthest from world-class status. A focus on the strategy is critical in achieving world-class supplier management and collaboration.

Table 2. Rate the importance of supply-chain management and collaboration to your organization’s success over the next five years:

	Electronics manufacturers	Electronics NWC SC	Electronics WC SC
1=Not important	2.5%	3.1%	0.0%
2	7.1%	10.1%	0.0%
3	18.0%	23.3%	4.3%
4	30.0%	29.5%	32.3%
5=Highly important	42.4%	33.9%	63.4%

Source: Next Generation Manufacturing Study

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Resources and Investments Support World-Class Strategies and Performances

Supply-chain performance management demands visibility into actionable information as well as the employees able to make real-time decisions via dashboards, scorecards, analytics, etc. Without information available to dedicated employees, how can the supply chain be improved?

Approximately one-fifth of electronics manufacturers (21 percent) have less than 1 percent of their workforces dedicated to supply-chain management (Table 3), and, similarly, 22 percent of electronics manufacturers invest less than 1 percent of sales (three-year average) into information technologies (hardware and software) (Table 4). Investments in both human resources and information technologies by electronics manufacturers at or near world-class supply-chain management and collaboration offer a contrast: Approximately 44 percent of electronics manufacturers at or near world-class status have *more than 5 percent* of their workforces dedicated to supply-chain management (compared to 22 percent of electronics manufacturers furthest from world-class status), and 40 percent of world-class performers have *more than 5 percent* of sales invested in information technology (compared to 25 percent of electronics manufacturers furthest from world-class supply-chain management and collaboration). Similarly, 40 percent of electronics manufacturers that invest more than 5 percent of sales into IT report their organization at or near world-class supply-chain management and collaboration, versus just 14 percent of electronics manufacturers that invest less than 1 percent in IT.

Chart 3. What percentage of your workforce is dedicated to supply-chain and partner development, management, and collaboration?

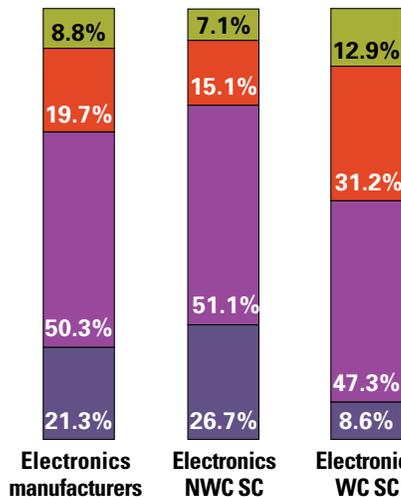
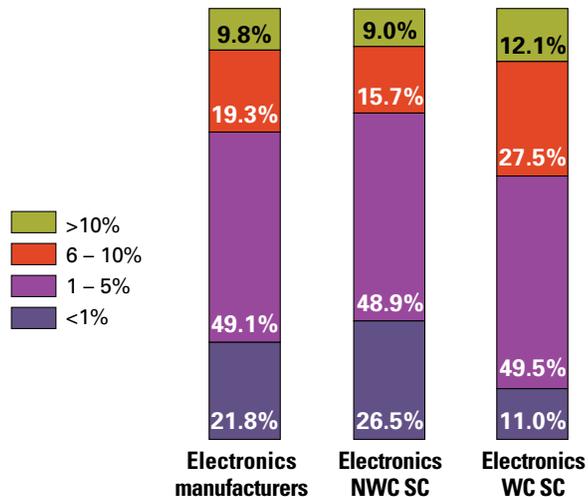


Chart 4. What is your organization’s investment in information technologies (hardware and software) as a percentage of sales (three-year average)?



Source: Next Generation Manufacturing Study

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Visibility of information is critical to supply-chain management and collaboration. Electronics manufacturers need to understand what’s happening, from furthest vendors to end customers: Are supplier components in compliance with product specifications and available in the quantity and at the required times? Is production able to accommodate new supplier materials for a new design? Is customer feedback flowing back up the supply chain so that all parties can react and improve? Is supply-chain performance managed in a manner that optimizes ROI?

Many electronics manufacturers don’t measure their supply-chain performances very well — if at all.

Many electronics manufacturers don’t measure their supply-chain performances very well — if at all. Approximately 20 percent of electronics manufacturers have “no measurements system per se or reviews” in place to assess the return from supply-chain management and collaboration efforts.

Another 29 percent have only “ad hoc monitoring of basic measures and ad hoc reviews” — in other words, when they really need to find data, they scramble for it. Only 9 percent of electronics manufacturers report having “regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization.”

Electronics manufacturers will find it difficult — if not impossible — to be proactive and stay ahead of supply-chain problems and challenges without appropriate measurement systems and tools. Electronics manufacturers at or near world-class status understand this, and they are much more likely to have advanced measurement systems in place: 81 percent report having better than ad hoc measurement systems, compared to only 39 percent of electronics manufacturers furthest from world-class supply-chain management and collaboration.

Table 5. What best describes your measurement system for reviewing return from supply-chain management and collaboration?

	Electronics manufacturers	Electronics NWC SC	Electronics WC SC
No measurement system per se or reviews	20.2%	26.4%	5.4%
Ad hoc monitoring of basic measures and ad hoc reviews	28.6%	34.8%	14.0%
Company-specific metrics monitored regularly by operations staff	19.6%	17.6%	22.6%
Regular monitoring and review of company-specific metrics by CEO and senior staff	20.3%	16.7%	38.7%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	8.7%	4.4%	19.4%

Source: Next Generation Manufacturing Study

Information technology isn’t a silver bullet, and won’t instantly improve an electronics manufacturer’s supply chain. Indeed, without sound practices and processes in place, and dedicated staff to manage and execute, new tools may only add complexity and may impair a firms’ ability to identify and solve problems. But with the right strategic focus — supply-chain management and collaboration — these tools can help electronics manufacturers close the loop on supply-chain performance management, aligning supplier activities with sales and operations planning processes.

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Performances Drive Future Success

Electronics manufacturers that apply best practices and resources to improve their supply chains expect to see tangible benefits for both their companies and their extended enterprises: Electronics manufacturers at or near world-class supply-chain management manage differently and outperform their industry peers.

The NGM Study reviewed the ability of electronics manufacturers supply chains to respond to unexpected customer demands for existing products. Approximately one in 10 manufacturers described their supply chains as highly advanced and responsive, with “real-time communication of demand signal and entire supply chain flexible to demand spikes — standard delivery times consistently met and just-in-time inventories” (*Table 6*). But 45 percent of electronics manufacturers report that some kind of delay — “major” or “minor” — occurred when communicating demand signals and that excessive inventories were needed to meet the demand.

Approximately 19 percent of electronics manufacturers at or near world-class status identified their supply chains as highly advanced and responsive extended enterprises, compared to just 6 percent of firms furthest from world-class status. In addition, the firms at or near world-class status were far less likely to indicate the presence of major or minor delays.

Table 6. What best describes your end-to-end supply chain’s ability to respond to unexpected customer demand for existing products?

	Electronics manufacturers	Electronics NWC SC	Electronics WC SC
Major delays communicating demand signal throughout chain and most suppliers struggle to efficiently meet demand — standard delivery times dramatically exceeded and/or excessive inventory	6.0%	7.7%	2.5%
Minor delays in communicating demand signal throughout chain and some suppliers struggle to efficiently meet demand — standard delivery time exceeded and/or too much inventory	38.9%	45.1%	24.7%
Efficient communication of demand signal throughout chain with most suppliers efficiently satisfying demand — standard delivery times nearly met and right-sized inventories	45.3%	41.2%	54.3%
Real-time communication of demand signal and entire supply chain flexible to demand spikes — standard delivery times consistently met and just-in-time inventories	9.0%	6.0%	18.5%

Source: Next Generation Manufacturing Study

Manufacturers have only just begun to examine the size of inventories residing throughout entire supply chains, and, similarly, research is now studying the movement of these inventories from OEMs up and down the supply chain. While many electronics executives believe that their firms are managing inventories more effectively within their own plants and companies, it’s clear from the new NGM Study data that some of this management was merely shifting inventory onto suppliers or out to customers.

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More than half of electronics manufacturers (53 percent) report that the total value of inventory in their supply chains for their primary product — furthest supplier to end customer — has been reduced by less than 10 percent over the last three years (*Table 7*). Only a handful of electronics manufacturers have made substantial improvements: 13 percent have decreased inventories by more than 25 percent over the last three years.

Electronics manufacturers at or near world-class status are more likely to have *some* success influencing inventory across their supply chains: 65 percent have reduced supply-chain inventory by 10 percent or more, compared to 40 percent of electronics manufacturers furthest from world-class supply-chain management. But the inability of even world-class performers to make substantial inventory reductions in their supply chains shows how difficult it is to completely remove inventory from large, complex supply chains. Too often delivery and customer satisfaction are maintained only through higher levels of buffer and safety stocks.

Table 7. By approximately what percentage has total value of inventory throughout the supply chain for your primary product (furthest supplier to end customer) been reduced over the last three years?

	Electronics manufacturers	Electronics NWC SC	Electronics WC SC
<10%	52.9%	59.6%	35.2%
10–25%	34.2%	27.8%	50.5%
26–50%	9.2%	9.0%	9.9%
>50%	3.8%	3.6%	4.4%

Source: Next Generation Manufacturing Study

Approximately one-quarter of electronics manufacturers describe their supply chain as a competitive advantage in terms of flexibility and speed to market because of strategic partnerships with suppliers and customers: 23 percent of electronics manufacturers report either “strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts” or “strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts and participate fully in strategic planning and identifying and responding to new markets” (*Table 8*). One-third of electronics manufacturers (33 percent) are still stuck in traditional buy-and-sell relationships where suppliers are measured only on cost, quality and delivery performance.

Electronics manufacturers at or near world-class status were nearly twice as likely to have assembled supply chains that represent competitive advantages, with approximately 36 percent citing the presence of strategic suppliers and customers in those supply chains, compared to just 19 percent of firms furthest from world-class supply-chain management and collaboration.

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Table 8. How is your supply chain a competitive advantage in terms of flexibility and speed to the marketplace?

	Electronics manufacturers	Electronics NWC SC	Electronics WC SC
Suppliers regularly measured on cost, quality, and delivery performance	33.4%	39.8%	17.8%
Suppliers regularly measured on cost, quality, and delivery performance as well as total acquisition cost	14.9%	14.8%	15.6%
Suppliers regularly measured on cost, quality, and delivery performance as well as total acquisition cost and "soft" qualities (e.g., trust, flexibility)	28.3%	26.9%	31.1%
Strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts	17.9%	15.7%	23.3%
Strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts and participate fully in strategic planning and identifying and responding to new markets	5.5%	2.8%	12.2%

Source: Next Generation Manufacturing Study

Superior supply-chain performance management also helps manufacturers to improve internally, as ideas, best practices, and resources are exchanged between supply-chain partners. For example, 42 percent of electronics manufacturers at or near world-class supply-chain management and collaboration report value-added per employee of more than \$125,000, compared to just 30 percent of electronics manufacturers furthest from world-class status (*Table 9*). These top performers also were more likely to have improved their value-add performance over the past three years: 76 percent of electronics manufacturers at or near world-class supply-chain management and collaboration had improved productivity by 25 percent or more over three years, compared to 57 percent of electronics manufacturers furthest from world-class status (*Table 10*).

Chart 9. What is your value-added per employee ([sales – cost of materials] ÷ number of employees)?

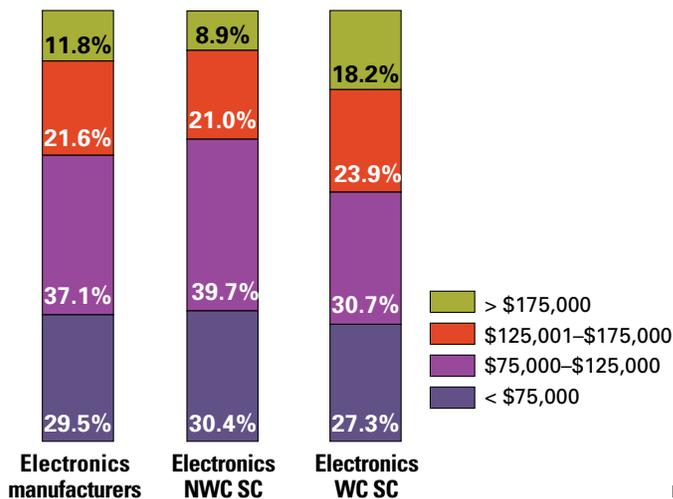
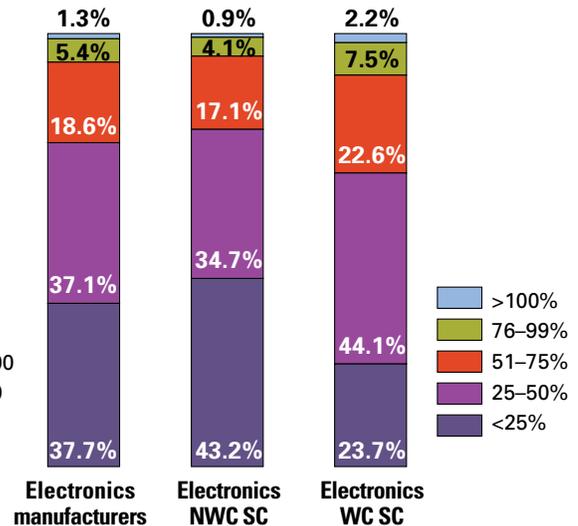


Chart 10. By what percentage has productivity (i.e., value add) improved over the past three years?



Source: Next Generation Manufacturing Study

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Superior supply-chain performance management also helps manufacturers to improve internally, as ideas, best practices, and resources are exchanged between supply-chain partners.

The presence of more advanced measurement systems for monitoring supply-chain returns is critical to improving toward world-class status, with these systems correlating strongly with improved performance:

- 66 percent of manufacturers with better than ad hoc measurements systems are able to respond to unexpected customer demand without major or minor communication delays and excessive inventories, versus 43 percent of those firms with no measurement systems or ad hoc systems.
- 54 percent of manufacturers with better than ad hoc measurements systems had reduced inventory across their supply chains by more than 10 percent over the past three years, versus 31 percent of those firms with no measurement systems or ad hoc systems.
- 30 percent of manufacturers with better than ad hoc measurements systems report “strategic suppliers and customers” are a competitive advantage, versus 16 percent of those firms with no measurement systems or ad hoc systems.
- 39 percent of manufacturers with better than ad hoc measurements systems report value-add per employee of more than \$125,000, versus 27 percent of those firms with no measurement systems or ad hoc systems.
- 68 percent of manufacturers with better than ad hoc measurements systems had improved productivity by 25 percent or more over the past three years, versus 56 percent of those firms with no measurement systems or ad hoc systems.

Similarly, higher investments in information technologies (IT) correlated to better performances. For example, 20 percent of electronics manufacturers that invest more than 5 percent of sales in IT respond to unexpected customer demand with “real-time communication of demand signal and entire supply chain flexible to demand spikes,” versus just 6 percent of those spending 5 percent or less on IT. And 74 percent of electronics manufacturers that invest more than 5 percent of sales in IT had improved productivity by 25 percent or more over the past three years, versus 57 percent of those spending 5 percent or less on IT.

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World-Class Supply Management Delivers to the Bottom Line

Electronics manufacturers at or near world-class supply chain management and collaboration are far more likely than their industry peers to focus on supply-chain management and collaboration as a strategy, apply human resources and information technologies toward it, and to be rewarded for those efforts with improved, above-standard performances. Just as telling are the comments from world-class firms in identifying their organizations' best practices for supply-chain management and collaboration. While many electronics manufacturers furthest from world-class status responded "none" or an equivalent ("we don't do this at all"), those at or near world-class supply-chain management and collaboration offered a cornucopia of ideas that revealed their dedication to the strategy:

- "Real-time communication of demand signal [across] entire supply chain."
- "Top management participation in supply-chain management."
- "We provide customer portals and blogs for communication with key clients; metrics provide trend analysis to clients."
- "Introduction of software from vendors to customers."
- "Metric reporting to world-class benchmark data."
- "Demand forecasting, sharing of data, open communication."
- "Our organization's best practice for supply-chain management is through collaborative planning, forecasting, and replenishment."

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Are these best practices found in your manufacturing organization? Have you developed trusted working relationships with supply-chain partners? Do you support supply-chain management and collaboration with staff and executives, business system investments, and a modern approach to applying best practices and improving processes? And do you monitor supply-chain

performance so that your company can proactively solve problems and make improvements, getting ahead of challenges before they escalate and migrate throughout the supply chain — and on to customers? Only by answering "yes" to all these questions will electronics firms truly reap the benefits and returns from supply-chain management and collaboration. Which type of electronics manufacturer is your firm?

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About The MPI Group

The MPI Group (MPI) is a Cleveland, Ohio-based research organization specializing in research development, analysis, and communications. MPI services include:

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¹ Kevin B. Hendricks and Vinod R. Singhal, "The Effects of Product Delays on Operating Performance," *Management Science*, May 2008.

² Data from the Next Generation Manufacturing (NGM) Study, which was coordinated by the American Small Manufacturers Coalition (an association of Manufacturing Extension Partnership centers and partners); conducted by the Manufacturing Performance Institute (MPI); and supported by Manufacturing Extension Partnership centers and partnering organizations. A total of 2,529 manufacturers participated; 325 manufacturers were identified as "electronics manufacturers" using NAICS codes that encompassed categories of both "consumer and electronic product manufacturing" and "electrical equipment, appliance and component manufacturing." For more information on the NGM Study, go to www.mpi-group.net.