

# Next Generation Manufacturing

## Next Generation Manufacturing Study 2008

### Executive Summary

prepared by

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## Introduction

The Wisconsin Next Generation Manufacturing Study was developed to better define the strategies and business activities necessary for world-class performance and success into the next generation. More than 500 manufacturers responded to the Study, which was commissioned by the Wisconsin Manufacturing Extension Partnership (WMEP) and conducted by the Manufacturing Performance Institute (MPI), a global research firm that annually conducts the largest study of manufacturers in the U.S.

The framework of the Next Generation Manufacturing (NGM) Study presents forward-looking strategies to drive manufacturing growth and profitability into the 21st century. The six Next Generation Manufacturing business activities examined are:

- Customer-Focused Innovation
- Engaged People/Human Capital Acquisition, Development and Retention
- Superior Processes/Improvement Focus
- Supply-Chain Management & Collaboration
- Green/Sustainability, and
- Global Engagement.

The NGM Study provides critical insights into the state's manufacturing base, revealing the diversity of conditions that exist within the state's industry. Possibly the most important is evidence that top-performing Wisconsin firms are focused on deploying tactics and strategies consistent with Next Generation Manufacturing – which means that many Wisconsin manufacturers are making progress across the spectrum of NGM activities.

Wisconsin is the only state in the nation to have conducted a study of this scope, which is certain to provide a wealth of data for state manufacturers, business leaders, state policymakers, economic development organizations and others. The NGM Study results also establish a “scorecard” for Wisconsin manufacturers

## ***Introduction, continued***

by which to measure progress in defining corporate strategies within their organizations, implementing best practices to support those strategies, and then reaping the performance improvements that take them into the next generation.

A critical first step for any single manufacturer or regional manufacturing base is to benchmark and compare performances. The Next Generation Manufacturing Study is an important effort in helping Wisconsin manufacturers to do so. Given the current economic slowdown, global competition, and the emergence of new competitive differentiators, the NGM Study data comes at an opportune moment.

Numerous Wisconsin firms have demonstrated that they can compete and win in a 21st Century economy by implementing NGM strategies. The good news is that the Wisconsin NGM Study proves that most Wisconsin firms have the right NGM priorities in place. The challenge, though, is that the gap between good intentions (awareness of the importance of NGM activities among the State's manufacturers) and their actual ability to implement these strategies (through best practices) remains wide – and will determine the success and failure of the State's manufacturing base going forward. NGM strategies – and the support to help the State's firms adopt them – represent a point of convergence for manufacturers and policy-makers. Manufacturers need to take proactive steps to implement NGM strategies; Wisconsin policy-makers must look for ways to help manufacturers put these strategies in place more quickly and more broadly than other regions of the country and world.

Next Generation Manufacturing offers Wisconsin unlimited opportunities for prosperity and leadership over the next century; the only question is the most important one: Are we ready?

Mike Klonsinski  
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## Summary Highlights

The following highlights can be explored in more detail throughout the text and tables of this Executive Summary. The highlights cover both data for all Wisconsin manufacturers as well as critical cross-tabulations of NGM Study findings. Note that findings for all Wisconsin manufacturers throughout this Executive Summary can usually be found in columns titled “All manufacturers.”

### ■ Progress toward world-class:

Firms that have made significant progress toward world-class status<sup>1</sup> in an NGM activity are more likely to outperform non-world-class peers, more likely to adopt best practices, and more likely to have placed high importance on the NGM activity. But simply believing an NGM activity is important doesn't necessarily lead to *world-class status*.<sup>1</sup> In fact, there's a large gap between Wisconsin firms' *recognition* of the importance of NGM activities and these firms' *ability* to achieve superior performances in NGM activities. In addition, smaller firms (as defined by revenue) are less likely to have progressed toward world-class status than larger firms.

### ■ Contrasts in success:

Many Wisconsin manufacturers report that they've achieved world-class status in one or more NGM activities, but a similar percentage has made no progress. For example, 7% of firms report themselves as “world-class” in Superior Processes/Improvement Focus, while 4% report no progress with this activity.

### ■ Contrasts in performance:

Developers of the NGM Study established aggressive thresholds for assessing superior performance levels. The good news is that many Wisconsin manufacturers are hitting these marks. For example, 10% of firms report value-added per employee of greater than \$175,000. Yet 32% of the firms report value-added per employee of less than \$75,000.

### ■ Contrasts in execution:

Many Wisconsin manufacturers report having adopted the best practices necessary to achieve high performance in an NGM activity, but, here too, many Wisconsin firms are either unaware of best practices, unable to execute them, or unwilling to try. For example, although 7% of firms have more than 10% of their workforces dedicated to Supply-Chain Management & Collaboration, fully 59% of firms report that the total value of inventory throughout their primary-product supply chain (and the costs associated with that inventory) have been reduced by less than 10% over the past three years.

### ■ Smaller manufacturers:

Smaller manufacturers (less than \$10 million in annual revenues) in Wisconsin are more likely to face challenges than larger firms with many NGM activities (achieving world-class status, implementing best practices). One area where they lag larger firms is in instituting measurement systems to track their path toward NGM. But there are a few areas, such as Green/Sustainability, where smaller firms do exhibit performance and best practices on par with larger companies.

### ■ **Recognizing the need to improve:**

Most Wisconsin manufacturers recognize the importance of Next Generation Manufacturing (NGM) activities. For example, 55% of firms say that Customer-Focused Innovation is “highly important.” Yet there is a portion of Wisconsin manufacturers that do not recognize the importance of NGM activities. For example, 20% rate Global Engagement as “not important” and 5% rate Supply-Chain Management & Collaboration as “not important.”

### ■ **Changing Leadership:**

Approximately one-quarter of Wisconsin manufacturers (23%) have a leadership succession planned in the next five years; another 31% may have a transition in leadership – meaning that more than half of all Wisconsin manufacturers are already at least considering their own next generation leaders. This represents a significant challenge and opportunity for the State over the next five years.

1. “World-class status” is generally considered to be a threshold of performance that is superior to that of the competition, supported by ongoing efforts to continually improve that performance, and comparable to the NGM activity description provided on the NGM Study questionnaire. For purposes of the Wisconsin NGM study, participants self-assessed their progress toward world-class status; these assessments were then cross-tabulated with performance data to verify the accuracy of these assessments. This study confirmed what research across thousands of manufacturing firms has learned over the past decade: Manufacturers who self-assess as being closest to world-class status consistently have better performance metrics and different management practices than those who self-assess at lower levels of world-class achievement. This means that firms seeking to improve generally do so by emulating the practices and performances of those organizations closest to world-class status.

### What Makes a Next-Generation Manufacturer?

The business strategies and best practices that comprise Next-Generation Manufacturing (across six broad activities) are familiar to Wisconsin manufacturers, but the focus on these activities — and the effort put into implementing associated best practices — varies widely among Wisconsin firms. These differences correlate to dramatic performance differences, juxtaposing “world-class” performance in a specific Next Generation Manufacturing activity against the struggles of other manufacturers in the state. Data from the Wisconsin Next Generation Manufacturing Study reveals:

1. Firms that are at or nearest to world-class status in a given Next-Generation Manufacturing activity are more likely to outperform their non-world-class peers.
2. These world-class firms achieve performance by managing in significantly different ways, including being more likely to use Next Generation Manufacturing best practices and investing in Next Generation Manufacturing activities.
3. Underlying both improved performances and the adoption of best practices and investments are core differences in awareness of Next Generation Manufacturing principles between world-class and non-world-class firms. Those firms that place more *emphasis* on Next-Generation Manufacturing activities are more likely to identify themselves as world-class in Next Generation Manufacturing activities — and to have *performances* that back up those claims. Aggregate world-class performance across the six activities for a given Wisconsin manufacturer clearly indicates that this firm is ready to compete in a Next Generation Manufacturing world.

The following sections identify overall responses to Study questions (“All manufacturers”) and walk through the progression of better performance (which firms achieve it?), use of best practices and investments (which firms are adopting them?), and emphasis placed on Next Generation Manufacturing (NGM) business activities (which firms are strategically focused?). For each of the six NGM activities to follow, the progression of research findings shows a clear path to success in the next generation.

## Customer-Focused Innovation:

*Develop, make, and market new products and services that meet customers' needs at a pace faster than the competition.*

### Performance

Approximately one-quarter of Wisconsin manufacturers at or nearest to world-class status (26%) report that more than 10% of their SKUs are new products, and 38% report that more than 25% of their annual sales are derived from products introduced in the past three years. Conversely, just 9% of Wisconsin manufacturers that have made the least progress toward world-class report that more than 10% of their SKUs are new products, and only 18% report that more than 25% of their annual sales are derived from products introduced in the past three years.

#### Status toward world-class

New products as a percentage of total SKUs launched annually	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<5	56.5%	67.9%	41.7%
5-10%	27.1%	23.0%	32.7%
11-20%	11.4%	5.7%	18.4%
>20%	5.0%	3.4%	7.2%
Percentage of annual sales derived from products introduced in the past three years			
<5	26.3%	34.8%	15.5%
5-25%	47.0%	47.0%	46.9%
26-50%	19.3%	13.9%	26.1%
>50%	7.4%	4.4%	11.5%

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## Best Practices

Nearly half of Wisconsin manufacturers at or nearest to world-class status (44%) report that more than 5% of their workforces are dedicated to new-product development/R&D, and 41% report that more than 5% of sales are invested in new-product development/R&D. These firms also are likely to have highly developed measurement systems for reviewing returns on investment (ROI) in new-product development: 18% have “regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization.” Conversely, just 19% of manufacturers that have made the least progress toward world-class status report that more than 5% of their workforces are dedicated to new-product development/R&D, and only 16% report that more than 5% of sales are invested in new-product development/R&D; more than one-third (42%) have no measurement system for this activity.

<i>Status toward world-class</i>			
Percentage of your workforce is dedicated to new-product development/R&D	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<1	22.1%	28.7%	13.7%
1-5%	48.4%	53.0%	41.9%
6-10%	16.4%	11.1%	23.3%
>10%	13.1%	7.1%	21.1%
Percentage of sales invested in new-product development/R&D			
<1	25.5%	34.1%	14.3%
1-5%	47.8%	49.8%	45.1%
6-10%	15.1%	8.7%	23.7%
>10%	11.6%	7.4%	17.0%
Measurement system for reviewing return from custom-focused innovation			
No measurement system per se or reviews	31.7%	42.3%	17.3%
Ad hoc monitoring of basic measures and ad hoc reviews	30.7%	34.7%	25.3%
Company-specific metrics monitored regularly by operations staff	9.9%	8.3%	12.0%
Regular monitoring and review of company-specific metrics by CEO and senior staff	18.0%	11.0%	27.6%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	9.7%	3.7%	17.8%

## Awareness and Focus

Approximately 68% of Wisconsin manufacturers at or nearest to world-class status in Customer-Focused Innovation ranked that activity as “highly important.” Only 44% of those that have made the least progress toward world-class status ranked the activity as highly important. While some firms have little hope of improvement – the 22% of firms that have made little or no progress toward world-class status in Customer-Focused Innovation *and* believe it’s not very important – state and industry attention should be directed toward the 44% that recognize Customer-Focused Innovation’s importance but are unable to achieve better performance.

Importance placed on Customer-Focused Innovation	Status toward world-class		
	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
Rating 1 to 3 (1=not important)	14.2%	22.1%	3.5%
Rating 4	31.3%	33.6%	28.6%
Rating 5 (5=highly important)	54.5%	44.3%	67.8%

## Engaged People/Human Capital Acquisition, Development and Retention:

*Secure a competitive performance advantage by having superior systems in place to recruit, hire, develop, and retain talent.*

### Performance

Two-fifths of Wisconsin manufacturers at or nearest to world-class status (40%) report value-added per employee of more than \$125,000; 24% of firms that have made the least progress toward world-class status report value-added per employee of more than \$125,000. The other key human-capital performance measure — annual labor turnover — is not as clearly linked to world-class status. For all Wisconsin manufacturers, world-class or not, approximately one-fourth of firms have annual employee turnover of 1% or less, and one-third have annual employee turnover above 5%. Since any kind of employee separation from an organization contributes to turnover, it's likely that manufacturers scaling back in the wake of the economic recession are driving this measure across both world-class and non-world-class firms.

	<i>Status toward world-class</i>		
Value-added per employee ([sales – cost of materials] ÷ number of employees)	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<\$75,000	32.3%	35.1%	25.9%
\$75,000-\$125,000	39.4%	41.4%	34.3%
\$125,001-\$175,000	18.1%	14.9%	25.9%
>\$175,000	10.2%	8.6%	14.0%
Annual labor turnover rate (number of voluntary and involuntary separations ÷ typical staffing level)			
0%	5.2%	5.4%	4.8%
0.1-1%	17.9%	18.6%	16.4%
1.1-5%	32.9%	30.0%	39.7%
5.1-10%	28.1%	28.4%	26.7%
>10%	16.0%	17.6%	12.3%

### Best Practices

Nearly half of Wisconsin manufacturers at or nearest to world-class status (48%) have a majority of their workforces in empowered work teams, and 20% train employees more than 40 hours annually. In addition, 17% of these manufacturers have more than 10% of their workforces dedicated to assessing and upgrading their organizations' talent pools, and 42% have highly developed measurement systems for reviewing ROI on human capital management. Conversely, 23% of firms that have made the least progress toward world-class status have a majority of their workforces in empowered work teams, and only 5% train employees more than 40 hours annually. Similarly, only 5% have more than 10% of their workforces involved in assessing and upgrading their organizations' talent pools, and 35% have no measurement systems and reviews in place.

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	<i>Status toward world-class</i>		
Percentage of employees that regularly participate in empowered work teams (i.e., make decisions without supervisor approval)	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<25	39.9%	46.1%	23.7%
25-50%	30.3%	31.1%	28.3%
51-75%	14.9%	12.9%	20.4%
76-90%	9.6%	6.4%	17.8%
>90%	5.3%	3.5%	9.9%
Formal training hours are devoted annually to each employee			
8 or fewer	29.0%	34.7%	15.1%
9-20	43.0%	44.4%	39.5%
21-40	18.4%	15.6%	25.0%
>40	9.7%	5.4%	20.4%
Percentage of employees are dedicated to assessing and upgrading your organization's talent pool			
<1	27.8%	32.7%	15.2%
1-5%	49.4%	49.3%	49.7%
6-10%	14.4%	12.9%	18.5%
>10%	8.3%	5.1%	16.6%
Measurement system for reviewing return from engaged people/human capital acquisition, development and retention			
No measurement system per se or reviews	28.3%	34.7%	12.6%
Ad hoc monitoring of basic measures and ad hoc reviews	35.7%	38.2%	28.5%
Company-specific metrics monitored regularly by operations staff	13.5%	12.4%	16.6%
Regular monitoring and review of company-specific metrics by CEO and senior staff	18.2%	12.9%	31.8%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	4.4%	1.9%	10.6%

## Awareness and Focus

Approximately 68% of Wisconsin manufacturers at or nearest to world-class status in Human-Capital Acquisition, Development and Retention ranked that activity as “highly important.” Only 42% of those that have made the least progress toward world-class status ranked the activity as highly important. While some firms have little hope of improvement – the 25% of firms that have made little or no progress toward world class status in Human-Capital Acquisition, Development and Retention *and* believe it’s not very important – state and industry attention should be directed to the 42% that recognize Human-Capital Acquisition, Development and Retention’s importance but are unable to achieve better performance.

<i>Human-Capital World-Class Innovation</i>			
Importance placed on Human-Capital Acquisition, Development and Retention	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
Rating 1 to 3 (1=not important)	18.5%	25.4%	2.0%
Rating 4	32.1%	32.9%	30.3%
Rating 5 (5=highly important)	49.4%	41.7%	67.8%

## Superior Processes/Improvement Focus:

**Record annual productivity and quality gains that exceed the competition through a companywide commitment to continuous improvement.**

### Performance

Nearly one-third of Wisconsin manufacturers at or nearest to world-class status (31%) report that more than 98% of deliveries reach customers in perfect order. That contributes to a majority of these superior manufacturers (54%) reporting that their customers have “strong loyalty to our products due to ongoing trust in our organization’s people and capabilities.” Many within this world-class group combine external performance with internal productivity: 26% have increased productivity (value added) by more than 50% over the past three years. A much lower percentage of firms that have made the least progress toward world-class status report that deliveries reach customers in perfect order (21%) or that their customers have “strong loyalty to our products due to ongoing trust in our organization’s people and capabilities” (40%). More than half of manufacturers that have made the least progress toward world-class (57%) report that productivity increased by *less than 25%*.

<b>Status toward world-class</b>			
<b>Percentage of deliveries reach customers in perfect order (on time, high quality, to all customer specifications)</b>	<b>All manufacturers</b>	<b>Rating 1 to 3 (1=no progress)</b>	<b>Rating 4 to 5 (5=world-class)</b>
<80%	8.6%	11.2%	5.0%
80-90%	16.0%	17.5%	14.1%
91-95%	23.6%	26.7%	19.5%
96-98%	26.5%	24.1%	30.0%
>98%	25.3%	20.5%	31.4%
<b>Customers' satisfaction with your overall performance</b>			
Customers' satisfaction with your overall performance			
Threatens to pull business because we don't match the competition	1.7%	2.3%	0.9%
Indifferent to buying our product or competitors	5.2%	7.6%	1.8%
Preference for our products by virtue of price, quality, and delivery performance	47.1%	50.0%	43.2%
Strong loyalty to our products due to ongoing trust in our organization's people and capabilities	46.0%	40.1%	54.1%
<b>Percentage productivity (i.e., value add) improved over the past three years?</b>			
<25%	48.1%	56.5%	36.3%
26-50%	33.0%	29.6%	37.7%
51-75%	12.9%	10.0%	17.2%
76-99%	5.0%	3.3%	7.4%
>100%	1.0%	0.7%	1.4%

## Best Practices

Two-thirds of Wisconsin manufacturers at or nearest to world-class status (66%) have a majority of their workforces fully engaged in their organizations' improvement methods/approaches, and nearly half have highly developed measurement systems for reviewing ROI on process improvements. These manufacturers also back up their hands-on improvement of processes with capital investments: 21% have spent more than 10% of annual sales over the past three years on capital equipment. Conversely, just 29% of firms that have made the least progress toward world-class status have a majority of their workforces fully engaged in their organizations' improvement methods/approaches, and only one-fourth have highly developed measurement systems to review ROI on process improvement. Just 11% of these struggling manufacturers have spent more than 10% of annual sales over the past three years on capital equipment.

<i>Status toward world-class</i>			
Percentage of workforce fully engaged in organization's specific improvement method/approach	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<26%	32.6%	45.9%	14.5%
26-50%	22.8%	25.2%	19.1%
51-75%	18.0%	15.1%	22.3%
76-99%	17.7%	8.5%	30.5%
100%	8.9%	5.2%	13.6%
Organization's investment in capital equipment as a percentage of sales (three-year average)			
<1%	7.6%	10.5%	3.7%
1-5%	51.5%	56.1%	45.2%
6-10%	25.7%	22.3%	30.6%
>10%	15.2%	11.1%	20.5%
Measurement system for reviewing return from process improvements			
No measurement system per se or reviews	15.3%	19.1%	10.0%
Ad hoc monitoring of basic measures and ad hoc reviews	28.2%	36.0%	17.8%
Company-specific metrics monitored regularly by operations staff	21.4%	19.8%	23.7%
Regular monitoring and review of company-specific metrics by CEO and senior staff	22.7%	19.5%	26.5%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	12.4%	5.6%	21.9%

## Awareness and Focus

Approximately 73% of Wisconsin manufacturers at or nearest to world-class status in Superior Processes/Improvement Focus ranked that activity as “highly important.” About half of those that have made the least progress toward world-class status ranked the activity as highly important. While some firms have little hope of improvement – the 19% of firms that have made little or no progress toward world-class status in Superior Processes/Improvement Focus and believe it’s not very important – state and industry attention should be directed to those 52% that recognize Superior Processes/Improvement Focus’s importance but are unable to achieve better performance.

<i>Status toward world-class</i>			
Importance placed on Human-Capital Acquisition, Development and Retention	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
Rating 1 to 3 (1=not important)	12.5%	18.9%	3.6%
Rating 4	26.4%	28.7%	23.5%
Rating 5 (5=highly important)	61.1%	52.4%	72.9

## Supply-Chain Management & Collaboration:

*Develop and manage supply chains and partnerships that provide flexibility, response time, and delivery performance that exceed the competition.*

### Performance

Approximately 22% of Wisconsin manufacturers at or nearest to world-class have been able to reduce inventories throughout their supply chains by more than 25% over the past three years, and 39% of these firms have supply chains in which “strategic suppliers and customers are active participants” in their operations. Only 8% of firms that have made no progress toward world-class status have been able to reduce supply-chain inventory by more than 25%, and just 17% have customers and suppliers as “active participants.”

<i>Status toward world-class</i>			
Percentage of total value of inventory throughout the supply chain for primary product (furthest supplier to end customer) reduced over the last three years?	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<10%	58.6%	61.9%	48.4%
10-25%	30.0%	30.2%	29.4%
26-50%	9.5%	6.7%	18.3%
>50%	1.9%	1.3%	4.0%
<i>Supply chain is a competitive advantage in terms of flexibility and speed to the marketplace</i>			
Suppliers regularly measured on cost, quality, and delivery performance	35.8%	41.9%	17.2%
Suppliers regularly measured on cost, quality, and delivery performance as well as total acquisition cost	10.4%	9.0%	14.8%
Suppliers regularly measured on cost, quality, and delivery performance as well as total acquisition cost and “soft” qualities (e.g., trust, flexibility)	31.5%	32.6%	28.9%
Strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts	17.5%	14.9%	25.8%
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	4.7%	1.6%	13.3%

## Best Practices

Approximately 38% of Wisconsin manufacturers at or nearest to world-class have more than 5% of their workforces dedicated to supply-chain activities, and 39% have highly developed measurement systems for reviewing ROI on supply-chain management and collaboration. Almost one-third of this world-class group (32%) have spent more than 5% of annual sales over the past three years on information technology (IT), an investment that helps them communicate and collaborate with their supply-chain partners. Conversely, just 17% of firms that have made the least progress toward world-class have more than 5% of their workforce dedicated to supply-chain activities, and only 14% have highly developed measurement systems for reviewing ROI on supply-chain management and collaboration. Just 16% of these manufacturers have spent more than 5% of annual sales on IT.

<i>Status toward world-class</i>			
Percentage of workforce dedicated to supply-chain and partner development, management, and collaboration	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<1%	26.2%	32.2%	7.0%
1-5%	51.8%	50.9%	54.7%
6-10%	15.5%	12.8%	24.2%
>10%	6.5%	4.1%	14.1%
Investment in information technologies (hardware and software) as a percentage of sales (three-year average)			
<1%	30.7%	36.0%	14.0%
1-5%	49.4%	48.0%	53.5%
6-10%	13.1%	10.4%	21.7%
>10%	6.8%	5.6%	10.9%
Measurement system for reviewing return from supply-chain management and collaboration			
No measurement system per se or reviews	28.6%	33.1%	13.8%
Ad hoc monitoring of basic measures and ad hoc reviews	32.8%	36.7%	22.3%
Company-specific metrics monitored regularly by operations staff	18.3%	15.9%	24.6%
Regular monitoring and review of company-specific metrics by CEO and senior staff	14.7%	10.8%	26.9%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	5.7%	3.6%	12.3%

## Awareness and Focus

Three out of five of Wisconsin manufacturers at or nearest to world-class status in Supply-Chain Management and Collaboration ranked that activity as “highly important.” Approximately 27% of those that have made the least progress toward world-class status ranked the activity as highly important. While some firms have little hope of improvement – the 43% of firms that have made the least progress toward world class status in Supply-Chain Management and Collaboration *and* believe it’s not very important – state and industry attention should be directed to the 27% that recognize Supply-Chain Management and Collaboration’s importance but are unable to achieve better performance.

Importance placed on Supply-Chain Management and Collaboration	Status toward world-class		
	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
Rating 1 to 3 (1=not important)	33.2%	43.4%	2.3%
Rating 4	31.3%	29.2%	37.7%
Rating 5 (5=highly important)	35.5%	27.4%	60.0%

## Green/Sustainability:

*Design and implement waste and energy-use reductions at a level that provides superior cost performance and recognizable customer value.*

### Performance

Wisconsin manufacturers at or nearest world-class status have an edge over non-world-class firms in green performance. More than one-third of manufacturers at or nearest to world-class status (36%) have reduced annual energy usage (per unit of product output) by 10% or more, and almost half (46%) have reduced their use of non-recycled material by 10% or more. In addition, 42% of this group of superior manufacturers report that 90% or more of their products are completely recyclable/reusable – and 15% report that *all* products are recyclable/reusable. Only 11% of firms that have made the least progress toward world-class status have reduced energy usage by 10% or more, and just 15% have reduced their use of non-recycled materials by 10% or more. Only 8% report that all products are completely recyclable/reusable.

Annual reduction in energy per unit of product output	Status toward world-class		
	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<10%	84.7%	88.8%	64.3%
10-25%	13.8%	10.3%	31.0%
26-50%	1.4%	0.7%	4.8%
>50%	0.2%	0.2%	0.0%
Annual reduction in usage of non-recycled material per unit of product output?			
<10%	80.0%	85.5%	54.1%
10-25%	16.0%	12.2%	34.1%
26-50%	3.1%	1.6%	9.4%
>50%	1.0%	0.7%	2.4%
Percentage of products (by sales volume) completely recyclable/reusable?			
<50%	55.7%	59.1%	38.4%
51-75%	10.7%	11.1%	9.3%
76-89%	8.2%	7.8%	10.5%
90-99%	16.6%	14.4%	26.7%
100%	8.8%	7.6%	15.1%

# Next Generation Manufacturing Executive Summary

## Best Practices

More than one-quarter of Wisconsin manufacturers at or nearest to world-class status (27%) have more than 10% of their workforces dedicated to reducing energy, material, or emissions, and, similarly, 27% have more than 10% of their workforces dedicated to green products. Approximately 34% of the world-class group also has highly developed measurement systems to review ROI on green/sustainability efforts. Conversely, just 4% of firms that have made the least progress toward world-class have more than 10% of their workforces dedicated to reductions of energy, material or emissions, and only 2% have more than 10% of their workforces dedicated to green products. Barely 6% have highly developed measurement systems to review ROI on green/sustainability efforts.

<i>Status toward world-class</i>			
Percentage of workforce dedicated to reducing energy, material, or emissions in your operations	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<1%	49.4%	56.3%	17.8%
1-5%	35.3%	34.7%	38.9%
6-10%	7.5%	5.3%	16.7%
>10%	7.9%	3.7%	26.7%
Percentage of workforce dedicated to Green products (product and packaging impact, green products and markets)			
<1%	58.9%	67.1%	20.5%
1-5%	28.4%	25.8%	42.0%
6-10%	6.0%	5.1%	10.2%
>10%	6.7%	2.1%	27.3%
Measurement system for reviewing return from green/sustainability efforts			
Measurement system for reviewing return from green/sustainability efforts			
No measurement system per se or reviews	61.3%	69.3%	24.4%
Ad hoc monitoring of basic measures and ad hoc reviews	20.0%	18.9%	25.6%
Company-specific metrics monitored regularly by operations staff	7.8%	6.2%	15.6%
Regular monitoring and review of company-specific metrics by CEO and senior staff	8.8%	5.3%	23.3%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	2.1%	0.2%	11.1%

## Awareness and Focus

Approximately 39% of Wisconsin manufacturers at or nearest to world-class status in Green/Sustainability ranked that activity as “highly important.” Just 6% of those that have made no or little progress toward world-class status ranked the activity as highly important. Because many Wisconsin manufacturers – world-class in Green/Sustainability and not-so-world-class – fail to see the importance of this NGM activity (67% ranked it as 1=3), state and industry attention should be directed to all manufacturers to promote Green/Sustainability’s importance.

Importance placed on Green/ Sustainability	Status toward world-class		
	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
Rating 1 to 3 (1=not important)	67.2%	76.6%	23.3%
Rating 4	21.2%	17.7%	37.8%
Rating 5 (5=highly important)	11.6%	5.7%	38.9%

## Global Engagement:

*Secure business advantages by having people, partnerships, and systems in place capable of engaging global markets and talents better than the competition.*

### Performance

Approximately 10% of Wisconsin manufacturers at or nearest to world-class status have increased sales outside of the United States by more than 100%; 17% operate or partner in non-U.S. production facilities in more than 10 countries, and 29% have sales and/or distribution facilities in more than 10 countries. Conversely, only 1% of firms that have made the least progress toward world-class status have increased sales outside of the United States by more than 100%; a mere 2% operate or partner in non-U.S. production facilities in more than 10 countries, and just 3% have sales and/or distribution facilities in more than 10 countries.

Percentage that dollar volume of sales outside the United States has changed over the past three years	Status toward world-class		
	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
<25%	77.0%	84.2%	50.5%
26-50%	15.8%	12.4%	29.4%
51-100%	4.1%	2.5%	10.1%
>100%	3.1%	1.0%	10.1%
<b>Countries outside of the United States that organization operates or partners in production facilities</b>			
0	67.3%	75.9%	34.9%
1-5	23.9%	19.7%	39.4%
6-10	3.7%	2.5%	8.3%
>10	5.2%	2.0%	17.4%
<b>Countries outside of the United States that organization has sales and/or distribution facilities</b>			
0	62.9%	71.1%	32.7%
1-5	23.7%	21.5%	30.9%
6-10	4.8%	4.2%	7.3%
>10	8.7%	3.2%	29.1%

# Next Generation Manufacturing Executive Summary

## Best Practices

One-fifth of Wisconsin manufacturers at or nearest to world-class status (20%) have more than 25% of their total direct workforces located overseas and/or located domestically and responsible for global business activities, and 39% have highly developed measurement systems to review ROI on global engagement. Conversely, only 2% of firms that have made the least progress toward world-class status have more than 25% of their total direct workforces located overseas and/or located domestically and responsible for global business activities, and just 10% have highly developed measurement systems to review ROI on global engagement.

<i>Status toward world-class</i>			
Percentage of total direct workforce located overseas and/or located domestically and responsible for global business activities	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
0%	58.3%	68.8%	19.8%
1-25%	36.0%	29.3%	60.4%
26-50%	3.6%	1.7%	10.8%
>50%	2.1%	0.2%	9.0%
Measurement system for reviewing return from global engagement			
No measurement system per se or reviews	59.8%	70.6%	18.5%
Ad hoc monitoring of basic measures and ad hoc reviews	16.5%	14.0%	26.9%
Company-specific metrics monitored regularly by operations staff	7.9%	5.9%	15.7%
Regular monitoring and review of company-specific metrics by CEO and senior staff	13.1%	8.6%	29.6%
Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization	2.7%	1.0%	9.3%

## Awareness and Focus

Three out of five Wisconsin manufacturers at or nearest to world-class status (60%) in Global Engagement (96%) ranked that activity as “highly important.” Approximately 10% of those that have made no or little progress toward world-class status ranked the activity as highly important. In this category there are many firms – justifiably or not – that do not want any part of a global future: 60% of *all* Wisconsin manufacturers rate it as not very important. State and industry attention should be directed first to those 10% that recognize Global Engagement’s importance but are unable to achieve better performance, and then to the many other firms ignoring this critical activity for success in the next generation.

Importance placed on Global Engagement	Status toward world-class		
	All manufacturers	Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world-class)
Rating 1 to 3 (1=not important)	60.6%	74.3%	9.9%
Rating 4	18.3%	15.3%	29.7%
Rating 5 (5=highly important)	21.1%	10.4%	60.4%

## Focusing on Next Generation Manufacturing Principles

In general, Wisconsin firms closest to world-class status in any given NGM activity are more likely to have better performances and to manage differently (within that activity) than their non-world-class peers. Not surprisingly, the foundation of these differences in performances and management start with significant gaps between firms in awareness of – and focus on – NGM activities.

Relatively familiar NGM activities are more likely to get the attention of Wisconsin manufacturers: Superior Processes/Improvement Focus (61% of Wisconsin manufacturers rate it “highly important”), Custom-Focused Innovation (55%) and Human-Capital Acquisition, Development and Retention (49%); few manufacturing executives would argue the importance of these activities. Newer, forward-looking activities such as Green/Sustainability and Global Engagement have a higher percentage of Wisconsin firms that rate the activities as “not important”: 16% and 20% of manufacturers, respectively.

Many firms in Wisconsin report they’ve reached “world-class” status in various NGM activities; many more don’t. But it’s important to note that the high percentages of manufacturers that fail to achieve world-class status in any given NGM activity are not surprising or necessarily alarming; in fact, they seem to indicate candor and objectivity among Wisconsin manufacturers in their self-assessments, especially since these findings are comparable to those of other studies that explore world-class attributes. The NGM activities of Green/Sustainability and Global Engagement indicate fertile territory for Wisconsin manufacturers to gain a competitive world-class advantage, since 55% and 60% of manufacturers, respectively, report having made little or “no progress” in these activities.

### Rate the importance to your organization’s success over the next five years:

	Customer-Focused Innovation	Human-Capital Acquisition, Development and Retention	Superior Processes/Improvement Focus	Supply-Chain Management and Collaboration	Green/Sustainability	Global Engagement
1=Not important	1.3%	1.3%	0.8%	4.7%	15.7%	19.6%
2	2.7%	3.2%	1.9%	8.5%	21.6%	20.9%
3	10.3%	14.0%	9.8%	19.9%	29.9%	20.2%
4	31.3%	32.1%	26.4%	31.3%	21.2%	18.3%
5=Highly important	54.5%	49.4%	61.1%	35.5%	11.6%	21.1%

### Rate your organization’s progress toward world-class [in the category]:

1=No progress	3.4%	7.8%	3.6%	9.4%	21.7%	29.0%
2	16.5%	23.2%	16.9%	25.6%	33.7%	31.3%
3	36.9%	40.1%	37.7%	40.3%	27.6%	18.5%
4	33.7%	23.8%	34.5%	21.8%	14.8%	16.8%
5=World-class	9.5%	5.1%	7.4%	3.1%	2.3%	4.4%

### Going Forward – Support and Resources

Wisconsin manufacturers will need assistance in moving forward with NGM activities and gaining the competitive advantages necessary to compete in coming decades. To date, many firms believe that available assistance – support services, peer groups, training opportunities and resources – in their respective regions is lacking. In fact, some firms believe that no support is available: 21% of Wisconsin manufacturers, for example, indicate that there is “no support” in their region for Global Engagement activities.

It’s important to note, though, that Wisconsin manufacturers themselves may contribute to this finding. Manufacturers that place *more* importance on a given NGM activity are *less* likely to report that no support for that activity is available. For example, 20% of Wisconsin manufacturers that place little or no importance on Superior Processes report that “no support” for Superior Processes is available (vs. 5% of firms that believe Superior Processes are highly important that report no support is available): i.e., if manufacturers believe a strategy is important for their success, they’re more likely to exert effort and find assistance. Similarly, the more progress toward world-class status a manufacturer has made in a given NGM activity, the less likely they are to generally believe that support is lacking.

# Next Generation Manufacturing Executive Summary

Extent that geographic region in Wisconsin has the support services, peer groups, training opportunities and resources available to support the following:	All manufacturers	Importance		
		Rating 1 to 3 (1=not important)	Rating 4	Rating 5 (5=highly important)
<b>Customer-Focused Innovation</b>				
1=No support	10.3%	15.1%	9.8%	9.1%
2	20.9%	20.5%	18.3%	22.4%
3	32.7%	37.0%	36.0%	29.7%
4	26.1%	21.9%	26.2%	27.3%
5=Full support	10.1%	5.5%	9.8%	11.5%
<b>Engaged People/Human-Capital Acquisition, Development and Retention</b>				
1=No support	6.5%	12.4%	4.1%	5.8%
2	23.5%	32.0%	23.1%	20.5%
3	31.7%	35.1%	32.0%	30.2%
4	29.4%	17.5%	33.1%	31.4%
5=Full support	9.0%	3.1%	7.7%	12.0%
<b>Superior Processes/Improvement Focus</b>				
1=No support	6.7%	20.3%	4.3%	5.0%
2	17.2%	23.4%	16.5%	16.3%
3	28.9%	29.7%	33.1%	27.0%
4	33.3%	25.0%	34.5%	34.5%
5=Full support	13.8%	1.6%	11.5%	17.2%
<b>Supply-Chain Management and Collaboration</b>				
1=No support	8.0%	11.8%	4.2%	8.0%
2	23.1%	27.1%	20.0%	22.5%
3	34.4%	36.5%	34.5%	32.6%
4	27.0%	18.8%	33.9%	27.8%
5=Full support	7.5%	5.9%	7.3%	9.1%
<b>Green/Sustainability</b>				
1=No support	16.5%	22.3%	6.4%	1.6%
2	29.1%	30.3%	25.5%	29.5%
3	33.0%	34.3%	33.6%	23.0%
4	14.8%	10.6%	16.4%	36.1%
5=Full support	6.7%	2.6%	18.2%	9.8%
<b>Global Engagement</b>				
1=No support	20.7%	25.4%	12.8%	13.8%
2	31.9%	33.4%	33.0%	25.7%
3	30.4%	28.9%	27.7%	37.6%
4	11.6%	8.7%	20.2%	12.8%
5=Full support	5.4%	3.5%	6.4%	10.1%

# Next Generation Manufacturing Executive Summary

Extent that geographic region in Wisconsin has the support services, peer groups, training opportunities and resources available to support the following:	All Manufacturers	Status toward world-class	
		Rating 1 to 3 (1=no progress)	Rating 4 to 5 (5=world class)
<b>Customer-Focused Innovation</b>			
1=No support	10.3%	10.0%	10.6%
2	20.9%	23.1%	17.7%
3	32.7%	38.5%	25.2%
4	26.1%	22.7%	30.5%
5=Full support	10.1%	5.7%	15.9%
<b>Engaged People/Human-Capital Acquisition, Development and Retention</b>			
1=No support	6.5%	7.0%	4.7%
2	23.5%	26.5%	15.3%
3	31.7%	34.1%	26.0%
4	29.4%	26.2%	38.0%
5=Full support	9.0%	6.2%	16.0%
<b>Superior Processes/Improvement Focus</b>			
1=No support	6.7%	7.2%	6.0%
2	17.2%	20.4%	13.0%
3	28.9%	33.9%	21.3%
4	33.3%	29.9%	38.4%
5=Full support	13.8%	8.6%	21.3%
<b>Supply-Chain Management and Collaboration</b>			
1=No support	8.0%	9.8%	3.1%
2	23.1%	24.9%	18.5%
3	34.4%	35.5%	30.8%
4	27.0%	24.4%	34.6%
5=Full support	7.5%	5.4%	13.1%
<b>Green/Sustainability</b>			
1=No support	16.5%	19.5%	2.3%
2	29.1%	30.4%	23.9%
3	33.0%	33.4%	30.7%
4	14.8%	12.1%	27.3%
5=Full support	6.7%	4.6%	15.9%
<b>Global Engagement</b>			
1=No support	20.7%	23.6%	9.5%
2	31.9%	33.7%	25.7%
3	30.4%	28.0%	39.0%
4	11.6%	10.8%	14.3%
5=Full support	5.4%	3.9%	11.4%

## Leadership

A majority of Wisconsin manufacturers (59%) are lead by chief executives who are more than 50 years old. A small percentage (7%) of companies are led by executives who are 40 years old or younger.

Approximately one-quarter of Wisconsin manufacturers (23%) have a leadership succession planned in the next five years; another 31% may have a transition in leadership — meaning that more than half of all Wisconsin manufacturers are already at least considering their own next generation leaders.

More than half of firms (52%) with chief executives over the age of 60 years old have a succession planned. Those firms with highest revenues (more than \$100 million) are more likely to have a succession planned for the next five years — 33% of highest revenue firms vs. 23% (\$10 million to \$100 million in revenues) and 20% (less than \$10 million in revenues) — although the highest-revenue firms are not more likely to have chief executives over 60 years old.

Age of organization's chief executive	
< 30	0.2%
31-40	6.4%
41-50	34.7%
51-60	39.0%
>60	19.7%

Planned succession of leadership in the next five years?	
Yes	22.5%
Maybe	30.8%
No	46.7%

## Other Findings

The Next Generation Manufacturing Study dataset is large and contains various large subsamples — such as the world-class groupings presented — that can be extracted, cross-tabulated and analyzed. Other key initial findings include:

### ***Small Manufacturers***

Wisconsin's smallest manufacturers (less than \$10 million in annual sales) are more likely to face challenges in achieving world-class performance and establishing best practices, which can ultimately impact their success over the next generation. For example, 64% of small manufacturers report that less than 1% of their companies SKUs are accounted for by new products (vs. 51% of firms with annual sales of more than \$100 million); and 46% report they have no measurement system in place to review new-product development (vs. just 6% of the largest firms). Small manufacturers are also less likely to be aware of, and place importance on, NGM activities; this makes them less likely to achieve world-class status within NGM activities.

But while small manufacturers trail their larger competitors in variety of NGM measurements, in other instances they are able to register performances comparable to larger firms. In the NGM activity of Green/Sustainability, for example, 47% of small manufacturers report that more than half of their products are recyclable/reusable (vs. 39% of large firms).

### ***Wisconsin Regions***

The number of manufacturers responding to the NGM Study was substantial enough in three of Wisconsin's geographic regions to evaluate regional differences: East Central (79 firms), South (98 firms), and Southeast (286 firms). Data on importance of NGM categories and progress toward world-class status for those categories were comparable. No clear trends on regional data were present, with one region reporting better performances or more abundant use of best practices within one NGM activity, while another region was likely to exhibit better performance and more use of best practices within another NGM activity.

### ***Aggregate Progress Toward World-Class Status***

Approximately 18% of Wisconsin manufacturers rated themselves 3, 4 or 5 (5=world-class) for all six of the NGM activities. (Approximately 3% rated themselves as 4 or 5 and less than 1% rated themselves as 5 for world-class across all six activities, sample sizes that were too small to allow meaningful analysis.) Progress across *all* six of the activities correlates to higher performance within almost *all* six of the activities. For example, 27% of this overall world-class group report that productivity (value-add) had increased over the past three years by more than 50%; none of the manufacturers that failed to rate 3, 4 or 5 in *any* activity reported that level of increased productivity, and only 19% of manufacturers that rated their firms as 3, 4 or 5 in *some* activities reported such productivity increases.

## Profile of NGM Study Respondents

Organization description	
Company	85.6%
Division/unit of a larger company	14.4%
Region	
Central	5.3%
East Central	14.9%
North	1.3%
South	18.5%
Southeast	53.9%
West Central I	3.2%
West Central II	1.7%
No region identified	1.3%

Years organization has been in operation	
Median	37
Average	44
75th Percentile	62
25th Percentile	20
Approximate annual revenues	
Median	\$14,000,000
Average	\$105,800,946
75th Percentile	\$40,000,000
25th Percentile	\$4,800,000
Full-time employees (and equivalents)	
Median	68
Average	415
75th Percentile	170
25th Percentile	29

## Methodology

The Wisconsin Next Generation Manufacturing Study was conducted using an online questionnaire. Respondents also had access to a PDF version of the survey that they could complete and mail back as a hard copy. There were 531 total respondents, with surveys received September and October 2008. Responses were received by the Manufacturing Performance Institute (MPI), and then entered into a database, edited, and cleansed to ensure answers were plausible, where necessary.

All respondent answers to the survey are confidential. As incentives, respondents who provided contact information along with their specific responses (354 respondents) were offered a copy of a NGM Performance Report, similar to this Data Report, which shows their responses next to answer categories comparable to their own profiles. Respondents who wished to remain anonymous could provide contact at a separate website and, as their incentive, receive an overall Data Report.

## About WMEP

WMEP is a private, nonprofit organization committed to the growth and success of Wisconsin manufacturers. WMEP is a leader in lean manufacturing, growth services, strategic business planning, quality systems and supplier development. During the past five years, WMEP-assisted manufacturers reported economic impact of \$931 million with 8,635 jobs created/retained. WMEP receives financial support from the Wisconsin Department of Commerce, and partners with many public and private organizations to serve Wisconsin manufacturers. For more information, visit [www.wmep.org](http://www.wmep.org) or call 1-877-856-8588.

WMEP's partners in the Wisconsin Next Generation Manufacturing Study include the Wisconsin Department of Commerce, Wisconsin Manufacturers & Commerce; Wisconsin Technical College System; Milwaukee 7; New North, Inc.; Racine County Economic Development Corp.; and the Northwest Wisconsin Manufacturing Outreach Center (NWMOC).

WMEP received partial funding for the study from the WIRED program coordinated by the Regional Workforce Alliance, along with grants from the federal Economic Development Administration and Wisconsin Department of Commerce.