Introduction

The Next Generation Manufacturing National Survey 2009 was developed to better define the strategies and business actions necessary for world-class performance and success into the next generation of manufacturing. More than 2,500 manufacturers across the United States responded to the Next Generation Manufacturing (NGM) Survey, a national research effort 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 in the following states and regions:

- Florida
- Illinois
- Kentucky
- Maine
- Massachusetts
- Missouri
- New Hampshire
- New Jersey
- North Dakota
- Ohio
- Oklahoma
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Texas
- Vermont
- Wisconsin

The NGM National Survey 2009 consisted of a questionnaire that sought to assess manufacturers’ awareness of the six NGM Success Attributes, their progress in implementing best practices to support NGM strategies, and success in achieving NGM operational and financial performances. The six NGM Success Attributes consist of the following:

**Customer-focused innovation**: Develop, make and market new products and services that meet customers’ needs at a pace faster than the competition.

**Engaged people/human capital acquisition, development and retention**: Secure a competitive advantage by having superior systems in place to recruit, hire, develop and retain talent.
Introduction

**Superior processes/improvement focus:** Record annual productivity and quality gains that exceed the competition through a company-wide commitment to continuous improvement.

**Supply-chain management and collaboration:** Develop and manage supply chains and partnerships that provide flexibility, response time and delivery performance that exceeds the competition.

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

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

The survey results establish a “scorecard” for U.S. manufacturers by which to measure progress in defining strategies within their organizations, implementing best practices to support those strategies, and reaping the performance improvements that will propel them into the next generation. A key first step in any manufacturing improvement initiative is to benchmark and compare performances; the NGM 2009 Survey provides these benchmarks.

1. This overview of survey results uses the phrase “at or near world-class status” to refer to those firms that answered “4” or “5” on a scale of 1-5 when asked “Rate your organization’s progress toward world-class” in each of the six NGM strategies (1 = no progress and 5 = fully achieved). Analysis of this “at or near world-class” group vs. “furthest from world-class” (those that answered “1,” “2,” or “3”) shows that the world-class group outperforms across the board — in awareness of NGM strategies, in adoption and implementation of best practices, and in achieving pace-setting financial and operational metrics. This Executive Summary uses these easy-to-understand groups to demonstrate leading and lagging performance in progress toward becoming Next Generation Manufacturers.
## Contents

- Introduction ................................................................. 2
- Overview and Findings................................................. 5
- What do Next Generation Manufacturers do well?............... 8
- What are the barriers to NGM?......................................... 11
- Customer-Focused Innovation (CFI).................................. 16
- Engaged People/Human Talent Acquisition, Development and Retention (EPT) ........................................... 21
- Superior Processes/Improvement Focus (SPI)...................... 26
- Supply-Chain Management & Collaboration (SCM) .............. 31
- Green/Sustainability (GS).................................................. 36
- Global Engagement (GE)................................................... 41
- Appendix A (NGM Success Attributes).............................. 46
- Appendix B (Methodology)............................................... 50
- Appendix C (Profile of NGM Companies)......................... 51
In stressful economic times it may seem out of place to focus on the future of manufacturing when survival is the priority of the day. While recession challenges the resiliency of American manufacturers, the impending recovery will test the preparedness of U.S. firms to win in a rapidly growing, highly competitive, global economy. We face a real possibility of surviving the downturn but losing the economic future—if competitors elsewhere in the world are better positioned to capture the next decade’s dynamic market growth. The risk is real and borne out in the results of this study.

Manufacturing employs 13 million Americans and drives job growth in supporting industries such as logistics, marketing, transportation and business services. Manufacturing accounts for roughly two-thirds of U.S. research and development expenditures and employs more engineers and scientists than any other private sector industry. Manufactured goods represent two-thirds of our exports and drive more net wealth creation than any other sector. Beyond the risks posed to our global manufacturing stature in these areas, U.S. manufacturing also faces intense international competition, increasing market volatility and complexity, a declining workforce, and a host of other challenges.

History and current experience around the globe shows that a strong manufacturing base drives a strong economy. The answer is not to shift away from manufacturing, but to transform our manufacturing base into a faster, more flexible industry capable of capturing global market share. Manufacturers that excel—Next Generation Manufacturing (NGM) firms—will execute new strategies, be led by people with different skills and backgrounds, and engage employees, suppliers and local service organizations in fundamentally different ways. The future of America’s manufacturing industry will hinge on its ability to execute Next Generation Manufacturing strategies.

The American Small Manufacturers Coalition and member Manufacturing Extension Partnership (MEP) centers commissioned the Next Generation Manufacturing Study to assess the country’s progress in implementing Next Generation Manufacturing (NGM) strategies. This national study of more than 2,500 manufacturing executives is one of the most comprehensive efforts ever undertaken to identify strategic priorities and assess the strategy implementation progress of U.S. manufacturers. The resulting “NGM scorecard” provides a gap analysis between where we are today and where we need to be to win today and the decade ahead.
Overview and Findings

What we found are critical threats that demand immediate action:

■ A serious gap exists between the strategies U.S. manufacturers believe are critical to their future success and their actual progress in implementing those strategies. More than a quarter of American manufacturers – representing over 90,000 firms – are at risk because they are not at or near world-class in any of the six strategies. These firms are already competitively compromised.

■ Small and midsize manufacturers are less likely than larger firms to be at or near world-class status in each of the next generation strategies. Even worse, one third of respondents with less than $10 million in annual revenue are not at or near world-class in any strategy, in contrast to 14 percent of respondents with over $100 million in revenue. In a country where 282,000 small and midsize firms comprise the backbone of the industry, this is a significant threat to U.S. competitiveness and the viability of these companies.

■ Green/sustainability ranks low among the strategic priorities for U.S. manufacturers despite increasing government regulation, growing consumer demand, and new requirements from large downstream manufacturers in their supply chains. Only 16% of respondents rank green/sustainability as highly important to their success over the next five years. Surprisingly, another 16% said it was not important.

■ Only 28% of respondents believe global engagement is highly important, despite a near-term future in which markets, talent, competitors and partner opportunities are growing faster outside the U.S. than within its borders.

■ In an increasingly networked world, trusted partnerships are a key competitive advantage, but today effective partnerships with employees, suppliers and regional support organizations are the exception rather than the norm. For example, the majority of respondents engage less than half of their employees in their organizations’ continuous improvement initiatives. Less than one-quarter of respondents engage their suppliers in their operations, product development or continuous improvement efforts.

■ Leadership loss represents a significant threat – or opportunity. One quarter of respondents say a planned leadership succession will occur within the next five years – potentially impacting 80,000 U.S. manufacturing firms. Another 29 percent think a succession may occur. This transition represents an opportunity to inject new ideas, energy and skill sets into the firms, but also represents a significant risk where a succession plan is not in place.
Overview and Findings

- Measurement systems are inadequately deployed. Comprehensive measurement systems are an indication of strategy commitment and a requirement for effective implementation. Yet few respondents have strong measurement systems in place. Even in one of the most fundamental and easy to measure areas—process improvement—46% of firms had only ad hoc measurement systems, or worse, none at all.

The implications are huge. The next generation manufacturers of the world will grab market share and reap the profits when a recovery occurs, while the unprepared will miss opportunities and lose customers. The regions of the world that are home to next generation manufacturers will gain quality jobs and secure wealth, while those regions with unprepared firms will feel the pain of job losses and a lower quality of life.

It’s not too late. American manufacturers enjoy the advantages of global manufacturing leadership, a culture of manufacturing innovation, a supportive infrastructure, a strong manufacturing workforce, and – for some period of time – a favorable currency. But these advantages can be quickly erased by competitors who are executing next generation strategies better than American firms. The Next Generation Manufacturing study results provide a wake-up call and a direction for restoring America’s manufacturing leadership.
What do Next Generation Manufacturers do well?

It is clear and appropriate that not every manufacturer tries to be world-class in every NGM Success Attribute. Some manufacturers choose to focus on customer-focused innovation while others create competitive advantage by being a leader in accessing global markets. But a review of the findings indicates that companies that identify themselves as world-class have some practices in common, regardless of the individual attribute.

Invest in strategy development
Achieving world-class performance doesn’t happen by accident or by virtue of being in a particular industry. Companies identifying themselves as world-class consistently dedicate more resources and people to its strategy implementation.

The study found a correlation between workforce dedication to NGM Success Attributes and performance “at or near world-class” levels in each of the six attributes.

<table>
<thead>
<tr>
<th>NGM Success Attribute</th>
<th>Furthest from World-Class</th>
<th>At or Near World-Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer-Focused Innovation</td>
<td>23.5%</td>
<td>47.5%</td>
</tr>
<tr>
<td>Engaged People/Human Talent</td>
<td>19.2%</td>
<td>37.7%</td>
</tr>
<tr>
<td>Superior Process/Improvement Focus</td>
<td>Not Measured</td>
<td>Not Measured</td>
</tr>
<tr>
<td>Supply-Chain Management &amp; Collaboration</td>
<td>17.9%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Green/Sustainability</td>
<td>9.9%</td>
<td>48.2%</td>
</tr>
<tr>
<td>Global Engagement</td>
<td>2.5%</td>
<td>24.1%</td>
</tr>
</tbody>
</table>
What do NGM companies do well?

Engage outside the walls of the firm

Employee engagement, supplier engagement, awareness and use of support resources ... world class firms consistently do a better job of engaging groups outside the management team to support their strategy.

More than 50% of the firm’s employees regularly participate in empowered work teams.

More than 50% of the firm’s workforce is fully engaged in the organization’s specific improvement method/approach.

Percent of firms that engage their suppliers and customers actively in operations, continuous improvement, and product development, strategic planning and identifying and responding to new markets.

In addition, higher performing manufacturers seek out and engage regional support services better than other manufacturers. Those firms at or near world-class consistently have a higher perception of regional support than those firms that are furthest from world-class.

<table>
<thead>
<tr>
<th>NGM Success Attribute</th>
<th>% of firms that believe the region has full support for Success Attribute implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer-Focused Innovation</td>
<td>9.5%</td>
</tr>
<tr>
<td>Engaged People/Human Talent</td>
<td>9.4%</td>
</tr>
<tr>
<td>Superior Process/Improvement Focus</td>
<td>13.0%</td>
</tr>
<tr>
<td>Supply-Chain Management &amp; Collaboration</td>
<td>7.6%</td>
</tr>
<tr>
<td>Green/Sustainability</td>
<td>6.9%</td>
</tr>
<tr>
<td>Global Engagement</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

Manufacturers performing at the highest levels perceive a higher level of regional support for NGM implementation.

Measure
What do NGM companies do well?

What gets measured, gets done. World-class manufacturers are more likely to have measurement systems that are consistently reviewed at the highest levels of the company and shared throughout the organization.

<table>
<thead>
<tr>
<th>NGM Success Attribute</th>
<th>Furthest from World-Class</th>
<th>At or Near World-Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer-Focused Innovation</td>
<td>17.3%</td>
<td>46.8%</td>
</tr>
<tr>
<td>Engaged People/Human Talent</td>
<td>15.1%</td>
<td>43.3%</td>
</tr>
<tr>
<td>Superior Process/Improvement Focus</td>
<td>22.7%</td>
<td>48.8%</td>
</tr>
<tr>
<td>Supply-Chain Management &amp; Collaboration:</td>
<td>26.6%</td>
<td>45.2%</td>
</tr>
<tr>
<td>Green/Sustainability</td>
<td>6.4%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Global Engagement</td>
<td>10.3%</td>
<td>46.7%</td>
</tr>
</tbody>
</table>
What are the barriers to NGM?

The importance of implementing Next Generation Manufacturing strategies is not a mystery to manufacturing leaders. Every U.S. manufacturing CEO would aspire to be world-class in all the critical NGM Success Attributes and every American policymaker wants to see the U.S. be a global leader in manufacturing.

But, of course, it is not as simple as knowing what to do. The study highlights some key structural barriers that get in the way of American manufacturers transformation to Next Generation Manufacturing status. Actions to mitigate these barriers will accelerate U.S. manufacturing performance. We describe five of these barriers below.

**Awareness Gap**

In general, American manufacturing executives are aware of the strategies necessary to win today. Superior Process Improvement, Customer-Focused Innovation, Engaged People, and Supplier Management are all strategies recognized as high priority by the majority of respondents.

What is notable is the low percentage of manufacturing executives—especially executives of small and midsize firms—who view Global Engagement or Sustainable Products and Processes as important. Some of these results may be attributed to the type of responding business. For example, a job shop that primarily sells to one large domestic customer may not see the importance of global engagement. Additionally, a company with fewer than twenty employees may not see how they can play in a global marketplace. But global markets are growing much faster than the domestic market, large buyers such as Wal-Mart are aggressively driving green metrics throughout their supply chains, and foreign and domestic governments are putting regulatory restrictions in place that demand green compliance. It is difficult to imagine the manufacturing world of 2015 without a significant adoption of best-practices in Global Engagement or Green/Sustainability. All indicators point to rapid evolution of these trends.
What are the barriers to NGM?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Awareness</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer-Focused Innovation</td>
<td>84.6%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Engaged People/Human Capital</td>
<td>76.7%</td>
<td>30.5%</td>
</tr>
<tr>
<td>Superior Process/Improvement Focus</td>
<td>86.3%</td>
<td>43.8%</td>
</tr>
<tr>
<td>Supply-Chain Management &amp; Collaboration:</td>
<td>68.2%</td>
<td>27.6%</td>
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<td>Green/Sustainability</td>
<td>35.1%</td>
<td>20.1%</td>
</tr>
<tr>
<td>Global Engagement</td>
<td>46.3%</td>
<td>24.6%</td>
</tr>
</tbody>
</table>

* Respondents that ranked the strategy as “4” or “5” on a 5-point scale

Global Engagement is likely to increase as the economy recovers, and the importance for Green/Sustainability will increase as more large companies and governments put requirements for green products and processes in place. In the meantime, it is important for policymakers and support organizations to recognize that education about the business advantages of implementing these strategies is as important as assistance in implementing these best-practices at this time.

Achievement Gap

Recent history shows that the world-class performance standards of today will be the standard performance expectations of tomorrow. Even metrics that were non-existent 10 years ago, such as perfect on-time delivery to customers, are in common use today. Companies that are at or near world-class performance are best positioned to grow rapidly in a recovery as customers purchase from those firms with the standards and capacity to deliver high quality products. Companies that wait for a recovery to begin before moving toward NGM standards of performance will be left behind, and their prospects for catching-up to top performers are small at best.

The study highlights an achievement gap that will hinder our ability to participate in a rapid and deep recovery. Less than one half of U.S. firms are at or near world-class in any particular strategy. Of much greater concern, 28 percent of U.S. manufacturers are not at or near world-class in any strategy. This means that as many as 90,000 manufacturers are wholly unprepared to compete in the Next Generation Manufacturing global economy.
What are the barriers to NGM?

**Size Gap**
Small and midsize manufacturers lag larger manufacturers in implementing strategic and operational changes. While small and midsize manufacturers can and often do surpass larger firms on key performance metrics, these firms typically face higher hurdles because they may not have the same level of cash, time, management depth, etc. as large firms. This resource gap constrains the ability of smaller firms to implement NGM strategies.

**Percentage of companies that achieved a World-Class Rating in:**

- All of the 6 NGM Success Attributes: 3.6%
- 2-5 of the NGM Success Attributes: 28.6%
- 1 of the NGM Success Attributes: 48.2%
- None of the NGM Success Attributes: 19.7%

We found similar size gap results in the NGM Study. Smaller manufacturers were less likely to achieve world-class or near world-class status in any of the six NGM Success Attributes.

**Percentage of companies NOT at a World-Class Rating in ANY Attribute:**

- LARGE > $100 Million: 26%
- MIDSIZE $10-100 Million: 33%
- SMALL < $10 Million: 14%

This achievement gap between smaller and larger companies is a cause for concern in light of the fact that the manufacturing economy continues to shift away from large, vertically-integrated firms toward smaller and more nimble firms. This presents a paradox; the adoption of strategies to achieve world-class performance must be adopted and accelerated in small and midsize firms—the group that has been shown to exhibit structural challenges to NGM implementation.

Policymakers have recognized this challenge and have traditionally made investments in smaller firms, most notably through the Manufacturing Extension Partnership system. Trends and data have clearly shown that the global competitiveness of small and midsize manufacturers is of increasing importance to the health of the regional economy.
What are the barriers to NGM?

Leadership Turnover

Leadership transition may be the most critical strategic issue facing America’s manufacturing base. Many research papers have been written about the shortage of skilled manufacturing workers and the aging of the manufacturing workforce. Yet, there has been little discussion about the aging of manufacturing leadership in this country and its impact on the manufacturing sector. This is an essential consideration, however, if we expect to achieve NGM transformation in the manufacturing economy. It simply will not happen unless it is driven by committed and capable executive leaders.

The NGM study reveals that at least 25 percent, and potentially as many as 54 percent, of CEOs will be leaving their leadership post within the next five years.

Percent of companies that have a leadership succession planned in the next five years.

These statistics cannot be understated. Change is driven and sustained from the top, and the most important driver of strategy in any company is the CEO. A talented, passionate, skilled CEO will lead the firm to a next level of performance. An exiting CEO is less inclined to make investments in the future, less inclined to drive new strategies, and less inclined to operate in ways that are different from those tactics that were successful in earlier years.

At a minimum, all manufacturing firms should have in place a succession plan for transitions expected within the next five years. Such a plan needs to be directly tied to the strategic plan that will drive business execution and performance.

A bigger imperative is to answer the question, “Where do we find the Next Generation Manufacturing leaders?” Success in manufacturing through 2015 and beyond will depend less on leaders with operational or product backgrounds and more on leaders with the skills to create effective networks of partners, operate in a global economy, and engage people in strategic and operational objectives. Manufacturers and policymakers have a shared interest in attracting Next Generation leadership talent to fill the impending vacancies.
What are the barriers to NGM?

Reaching outside the organization
Self-reliance and an independent spirit have served American manufacturers well, but these qualities can work against collaboration - a key characteristic necessary to win in a 2015 economy. Today's world requires a collection of talents in product design, development and commercialization to create highly responsive, customized products to serve more segmented global markets. It is becoming a competitive detriment to house all of the resources necessary to meet these demands under one company. The ability to manage and leverage complex networks in an extended enterprise is not just a competitive advantage—it is a requirement for success.

This is supported in the study. We found that companies which are at or near world-class performance benchmarks are much more likely to engage employees, suppliers, and regional support resources in a “capability network” in their operations.

Unfortunately, collaboration is a practice that is not widespread in the manufacturing world. The majority of manufacturers engage less than one half of their workforce in the company’s improvement methodology or in empowered work teams. Less than one quarter of manufacturers include strategic suppliers in the company’s operations or planning. It is hard to break from the traditional view about the role of employees and suppliers, but the data shows that companies which view employees and suppliers as business assets, and not as expenses or hired hands, perform better.

Collaboration is lacking between companies and employees and between companies and their suppliers.

The Next Generation Manufacturer successfully engages suppliers, customers, academic institutions, business assistance services, government agencies and employees in an extended enterprise—one that becomes greater than the sum of its parts. Enabling effective partnerships is a fundamental requirement for NGM CEOs and U.S. policymakers in order to promote U.S. manufacturing competitiveness.
Customer-Focused Innovation (CFI)

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

Through 2015 and beyond, growth will not merely be fuelled by increased market share and higher sales volume. Instead, it will be powered by rapid development and deployment of profitable products, services and solutions that serve more highly-segmented customer needs. A focus upon delivering high-value customer solutions—not products or services alone—will differentiate the best manufacturers from the rest. Product lifespan will continue to shorten and mere product extensions will be poorly adapted to meet the increasing demand for unique and specialized products and services. Companies that master profitable and sustainable innovation will thrive, while companies that struggle with this competitive advantage will be severely compromised.

Awareness

A clear majority of manufacturers (84.6 percent) recognize that Customer-Focused Innovation (CFI) is important or highly important to their business success over the next five years, although more than 15 percent think customer-focused innovation is of average to no importance.

Further analysis of the data indicates nearly three quarters (72.3 percent) of the companies that rank themselves world-class in this NGM attribute, also consider it highly important to their business success in the next five years.

Rate the importance of customer-focused innovation to your organization’s success over the next 5 years:
Customer-Focused Innovation (CFI)

Current Progress

- Fewer than one third of manufacturers (30.6 percent) have a measurement system at or near world-class for reviewing their return on CFI, with “regular monitoring and review of company-specific metrics by CEO and senior staff.”

- More than two thirds of manufacturers (69.4 percent) have measurement systems that are furthest from world-class. Indeed, more than one quarter (27.6 percent) have no such systems at all. Manufacturers that do not track the success of product launches, market acceptance, and value to the customer, cannot expect to record improvement in CFI performance or growth over time.

What best describes your measurement system for reviewing return from customer-focused innovation?

Expanded descriptions:
1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization
Customer-Focused Innovation (CFI)

- Respondents were almost evenly split in the perception of their progress toward world-class CFI, with 45.5% percent at world-class or near world-class performance, and 54.5% percent making average to no progress.

Rate your organization’s progress toward customer-focused innovation:

![Progress Chart]

As measured by the defined CFI benchmarks, only one third or fewer manufacturers have actually reached performance at or near world-class levels. In contrast, roughly two thirds or more of respondents are performing at levels that are furthest from world-class.

- Good to world-class performance in customer-focused innovation can only be sustained and supported with an equivalent investment in the people and resources to achieve it. Yet, almost one quarter of manufacturers (23.1% percent) invest less than 1 percent of sales into new product development, and 67.8% percent invest 5 percent or less. All told, fewer than one third of companies invest in CFI at levels cosidered at or near world-class.

What percentage of sales is invested into new product development/R&D?

![Investment Chart]
Customer-Focused Innovation (CFI)

- Even more telling in the low pace of customer-focused innovation is the fact that a majority of manufacturers (84.2 percent) annually launch less than 10% new products (as a percentage of total SKUs, not product line extensions)—the levels furthest from world-class. Only 15.7 percent of manufacturers are at or near world-class performance in this benchmark, launching at a level of 11% or greater.

  How many new products as a percentage of total SKUs are launched annually? (Include only new SKUs, not a product iteration or line extension.)

- As measured by the percentage of annual sales derived from products introduced in the last three years, over three quarters of manufacturers (75.4 percent) are performing at levels furthest from world-class. Only one quarter (24.6 percent) are at or near world-class performance levels, with twenty-six percent or more of annual sales tied to new products.

  Approximately what percentage of annual sales are derived from products introduced in the past three years?
Customer-Focused Innovation (CFI)

- Low-performance behaviors are reflected in the use of the workforce dedicated to new product development as well. Here, one in five manufacturers (22.2 percent) dedicate less than one percent of their workforce to product development and 65.5 percent dedicate 5 percent or less of their workforce to Customer-Focused Innovation.

What percentage of your workforce is dedicated to new product development/R&D?:

What Does it Mean?
Customer-Focused Innovation is an essential core competency for any company that profitably competes for customers and market share. It will be enormously difficult, if not impossible, for American manufacturers to compete on price, or even quality, alone in the future. Foreign competitors will increasingly have the price advantage. In growing numbers, they are beating U.S. Manufacturers on quality, as well. Only by serving more customers in better ways, that deliver increasing value over time, will our manufacturers effectively compete in the global economy. Manufacturers that score low in CFI benchmarks are at serious risk of losing out in a global marketplace that rewards high-value innovation and penalizes innovative inertia or regression.
Secure a competitive advantage by having superior systems in place to recruit, hire, develop and retain talent.

People, process, technology and culture are the four elements that define and drive company success and competitiveness. Manufacturers that do not adopt and apply best practices in advanced talent management cannot expect to effectively compete in an intensely competitive global marketplace. Manufacturers’ responses show that perilously few—less than one third—are making what they consider to be good to world-class progress in this area, even though most already recognize the importance of talent management to future business success. Actual performance in all of these benchmarks closely corresponds to their perceived progress, with less than one-third of manufacturers actually making good to world-class progress.

**Awareness**

More than three-quarters of manufacturers (77 percent) recognize the importance of human capital acquisition, development and management to their success over the next five years. It is a matter of concern that almost one-quarter (23 percent) believe that this is of average or no importance to their business success in the next five years. More than two-thirds (69.5 percent) of respondents who ranked their performance at or near world-class also ranked this success attribute as being highly important, whereas only half that number (35.5 percent) that were furthest from world-class performance ranked it as highly important.

Rate the importance of human-capital acquisition, development and retention to your organization’s success over the next five years:

![Importance Distribution Chart]

- **Furthest from World-Class**
  - 23.2%

- **At or near World-Class**
  - 76.7%

- **Not Important**
  - 2.5%

- **Somewhat Important**
  - 6.1%

- **Average Importance**
  - 14.6%

- **Important**
  - 30.8%

- **Highly Important**
  - 45.9%
Engaged People/Human Talent (EPT)

Current Progress
Whereas the majority of manufacturers scored well in the awareness of the importance of human capital management to their business success, nearly the same percentage are using metrics to measure returns that are furthest from the world-class standard. This illustrates that awareness does not translate to corresponding action and progress.

While 76.7 percent of manufacturers recognize the importance of human capital management to their business success, 76.3 percent are operating furthest from world-class with basic or ad hoc monitoring, or no measurement systems at all.

What best describes your measurement system for reviewing return from human-capital acquisition, development and retention?

Expanded descriptions:
1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization
Engaged People/Human Talent (EPT)

- Over two thirds of manufacturers (69.5 percent) rank their progress furthest from world-class in this success attribute, with less than a third (30.5 percent) believing they have made progress at or near world-class. There is an almost identical distribution between those that think they have made little to no progress (31.9 percent) and those that believe they have made good to world-class progress (30.5 percent).

- Most manufacturers’ actual performance toward Next Generation Manufacturing world-class benchmarks for human capital management mirrors their perceived progress. This suggests they at least have good internal awareness of their performance gap in this success attribute.

Rate your organization’s progress toward world-class human capital acquisition, development and retention.

For example, over two thirds (70.7 percent) of manufacturers devote twenty hours or fewer to formal annual training of each employee in their company, a performance level that is furthest from world-class. Less than a third (29.3 percent) are at or near world-class performance in this benchmark.

How many formal training hours are devoted annually to each employee?
Engaged People/Human Talent (EPT)

- Annual turnover rates underscore general underperformance in this success attribute, with recurring patterns. In this benchmark, over two thirds of companies (70.7% percent) have annual turnover rates that are furthest from the world-class standard, with turnover rates of 1.1 percent to greater than 10 percent. Fewer than one-third of manufacturers (29.3 percent) are at or near the world-class benchmark of less than 1 percent in annual labor turnover.

What is your organization’s annual labor turnover rate (number of voluntary and involuntary separations ÷ typical staffing level)?

- Similarly, when benchmarking value-added per employee, almost three quarters (72 percent) of manufacturers are performing at levels that are furthest from world-class, while a little more than one-quarter (28 percent) at or near the world-class performance level.

What is your value-added per employee ([sales – cost of materials] ÷ number of employees)?
What percentage of employees are dedicated to assessing and upgrading your organization’s talent pool?

![Graph showing percentage of employees dedicated to assessing and upgrading talent.]

What percentage of employees regularly participate in empowered work teams (i.e., make decisions without supervisor approval)?

![Graph showing percentage of employees participating in empowered work teams.]

What does it mean?
While over three quarters of manufacturers believe human talent management is important or highly important to their business success over the next five years, less than one third are at or near world-class performance in this vital business management proficiency. All across the benchmarks of actual performance, awareness is not being forged into action, and the majority of U.S. manufacturers are self-imposing dangerous risks upon their future by failing to redress their talent management deficiencies. In a future that will bring increasing competition for scarce talent, a massive wave of retirements in the baby-boom generation (along with the loss of their knowledge, skills and talents), and a rising, increasingly-educated and skilled workforce in the Southern and Eastern Hemispheres, American manufacturers must move with speed and urgency to achieve dramatically better performance in talent acquisition, recruitment, development and retention. Failure to do so practically assures long-term competitive decline in our manufacturing sector.
Record annual productivity and quality gains that exceed the competition through a company-wide commitment to continuous improvement.

Systemic continuous improvement will be a key competitive differentiator through 2015 and beyond. Successful attainment of key benchmarks in this success attribute will divide prosperous, successful competitors from mere contenders. Manufacturers that embrace this imperative and adopt the best practices that help to achieve it, will earn the opportunity to reach overall world-class performance in Next Generation Manufacturing. Companies that cannot or will not climb this curve will lose market share, customers and the ability to compete with companies that do.

Awareness
There is clear recognition among manufacturers that process improvement is important to their business success over the next five years. A strong majority of manufacturers (86.3 percent) believe that this will be important to highly important to their organizations. Only 13.7 percent consider this to be of average to no importance.

Rate the importance of process improvement to your organization’s success over the next five years:
Superior Processes/Improvement Focus (SPI)

Current Progress

- Approximately two-thirds of manufacturers (65.9 percent) are using metrics that are furthest from world-class standards to measure the return from process improvements in their companies. Only 34.2 percent are using metrics that qualify as nearest to world-class.

What best describes your measurement system for reviewing return from process improvements?

Expanded descriptions:
1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization
Superior Processes/Improvement Focus (SPI)

- Although most manufacturers recognize the importance of this success attribute to their companies’ success over the next five years, fewer than half (43.8 percent) rank their progress as good or world-class. More than half (56.2 percent) believe they are making average to no progress. Clearly, there is a striking performance gap in this success attribute.

Rate your organization’s progress toward world-class processes and process improvement:

- It is an article of faith in continuous improvement that company workforces must be fully involved in driving and sustaining productivity gains in manufacturing. Yet, in assessing what percent of the workforce has been fully engaged in improvement methods, three quarters (75.5 percent) of manufacturers are performing at levels furthest from the world-class standard, while only one quarter (24.6 percent) are at or near the world-class standard.

What percentage of your workforce has been fully engaged in your organization’s specific improvement method/approach?
Superior Processes/Improvement Focus (SPI)

- In assessing actual productivity gains over the last three years, a mere 7.7 percent of manufacturers reported performance at or near the world-class standard, while 92.2 percent have performed at levels furthest from the world-class performance benchmark.

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

- Significantly better results were registered when measuring customer satisfaction and delivery performance. Over 90 percent of manufacturers (93.4 percent) reported reaching performance at or near the world-class benchmark for customer satisfaction. Only 6.5 percent reported performance at levels furthest from world-class performance.

Describe your customers’ satisfaction with your overall performance?

American Small Manufacturers Coalition

Next Generation Manufacturing Page 29
Superior Processes/Improvement Focus (SPI)

- Nearly 58 percent of manufacturers reported they are at or near world-class performance in achieving on-time, high quality deliveries in accordance with customer specifications, while 42.4 percent indicate they are furthest away from the world-class performance in this benchmark.

What percentage of deliveries reach customers in perfect order (on time, high quality, to all customer specifications)?)

In the intensely competitive global market, continuous improvement to reduce cost, waste, inefficiency and to raise productivity, value and quality is a survival skill, not a luxury.

What does it mean?
Companies that do not recognize that continuous improvement is an imperative—not an option—in the global marketplace are at serious risk of losing competitive advantage. We have seen all too many recent examples in the current recession of companies that did not take this success attribute seriously and have been erased from existence—suddenly and mercilessly. Companies that recognize its importance but fail to execute upon it are at equal risk. In the intensely competitive global market, continuous improvement to reduce cost, waste and inefficiency and raise productivity, value and quality is a survival skill, not a luxury. U.S. manufacturers are too far behind in this fundamental success attribute and must invest in building significantly higher performance in systemic continuous improvement. They need to adopt best practices in enterprise-wide continuous improvement now, if they hope to attain and maintain a competitive advantage in a global marketplace that rewards profitable productivity.
Supply-Chain Management & Collaboration (SCM)

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

For all manufacturers, the robustness, reliability and responsiveness of the supply chain is inextricably linked to the overall value chain. To create and deliver continuing value to customers, the supply chain must provide continuing value creation. Making this work, and managing its complexity, is a constant challenge for manufacturers, but getting this right is essential to being an effective competitor. Survey results in this success attribute show a consistent pattern of low supply chain maturity among manufacturers, with most responses falling furthest from world-class performance for this benchmark.

Awareness
As in most of the other NGM benchmarks, there is a marked contrast between recognition of the importance of supply chain management and collaboration, and actual performance toward world-class benchmarks. More than two thirds (68.2 percent) of manufacturers believe supply chain management and collaboration is important to highly important to their companies’ success over the next five years, yet less than a third rank their progress as good to world-class.

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

Survey results in SCM show a consistent pattern of low supply chain maturity among manufacturers with most responses falling the furthest from world-class performance categories.
Supply-Chain Management & Collaboration (SCM)

Current Progress

- When assessing the caliber of their measurement system for reviewing return from supply chain management and collaboration, slightly more than three quarters of manufacturers (75.6 percent) rank their metrics as furthest from world-class, with around one-quarter (24.4 percent) ranking them at or near world-class.

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

- Nearly three-quarters of manufacturers (72.4 percent) rank their progress on supply chain management and collaboration furthest from world-class performance. Slightly more than one quarter (27.6 percent) report progress at or near world-class.

Rate your organization’s progress toward world-class supply-chain management and collaboration:
Supply-Chain Management & Collaboration (SCM)

- The benchmark that may best reflect the degree of supply chain maturity in this survey is the measure of supply chain agility and flexibility. Results here suggest some distinctly better performance among manufacturers. Almost two thirds of manufacturers (62.7 percent) report they are at or near world-class performance in assessing their end-to-end supply chain’s ability to respond to unexpected customer demand for existing products, whereas more than one third (37.4 percent) assess their performance against this benchmark as furthest from world-class.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furthest from World-Class</td>
<td>37.4%</td>
</tr>
<tr>
<td>At or near World-Class</td>
<td>62.7%</td>
</tr>
<tr>
<td>Major delays</td>
<td>4.4%</td>
</tr>
<tr>
<td>Minor delays</td>
<td>33.0%</td>
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<tr>
<td>Efficient</td>
<td>50.1%</td>
</tr>
<tr>
<td>Real-time</td>
<td>12.6%</td>
</tr>
</tbody>
</table>

Expanded descriptions:

1. Major delays communicating demand signal throughout chain and most suppliers struggle to efficiently meet demand — standard delivery times dramatically exceeded and/or excessive inventory
2. 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
3. Efficient communication of demand signal throughout chain with most suppliers efficiently satisfying demand — standard delivery times nearly met and right-sized inventories
4. Real-time communication of demand signal and entire supply chain flexible to demand spikes — standard delivery times consistently met and just-in-time inventories
Supply-Chain Management & Collaboration (SCM)

- Another benchmark that measures supply chain performance is the connectivity of the supply chain network, both internal and external. This is a measure of how well data and information flow across network hubs powered by robust technology. Here the distribution of performance, both nearest to world-class and furthest from world-class, is concerning and similar to other findings in this success attribute. In particular, over three quarters (78.7 percent) of manufacturers’ investment in information technologies as a percentage of sales falls furthest from world-class performance, while less than one quarter (21.3 percent) fall at or near world-class performance.

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

![Bar chart showing investment percentages]

- Furthest from World-Class: 78.7%
- At or near World-Class: 21.3%
- <1%: 28.8%
- 1-5%: 49.9%
- 6-10%: 15.1%
- >10%: 6.2%
Supply-Chain Management & Collaboration (SCM)

- Virtually identical distributions are seen in assessing the flexibility and speed of the supply chain for competitive advantage. Here, over three quarters of manufacturers (77.4 percent) fall furthest from world-class performance, whereas less than one quarter (22.7 percent) are at or near world-class performance.

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

![Supply Chain Performance Graph]

**What does it mean?**

Generally, a consistent core of approximately three quarters of manufacturers reach performance levels furthest from the world-class benchmarks in supply chain management and collaboration. Actual performance is almost inversely proportional to perceived progress in reaching the world-class benchmarks in this area, so awareness does not correlate with action toward better performance.

Achieving high performance in this success attribute will be a key success factor for manufacturers in the near and distant future, as supply chain networks become increasingly complex, more demand-driven (with low standing inventories) and increasingly impacted by more stringent original equipment manufacturer (OEM) supplier requirements and environmental regulation.
Green/Sustainability (GS)

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

Increasingly, sustainable manufacturing products and processes will be seen as essential competitive differentiators in the competitive global marketplace. Companies that adopt environmentally responsible best practices in energy and material use, and reduce costly waste and strain on resources, will be rewarded with higher customer satisfaction and promotion. Those manufacturers that fail to adopt these best practices will become increasingly isolated from their customers, lose market share and suffer increasingly costly forms of regulation and sanctions from regulatory bodies. Many OEMs operating outside the U.S. now require compliance with robust environmental quality standards from their suppliers. These trends are quickly gaining velocity and momentum; they are also irreversible. This represents a new business reality that demands urgent response from American manufacturers. The key finding in this Next Generation Manufacturing success attribute is that there is a lot of work to do to lift manufacturers toward world-class performance.

Awareness

Nationally, nearly two thirds of manufacturers (64.9 percent) rate green/sustainability of average to no importance to their companies’ success over the next five years. Slightly more than one-third of manufacturers (35.1 percent) rate this as important to highly important to their business success over the next five years.

Rate the importance of Green/Sustainability to your organization’s success over the next five years:

```
<table>
<thead>
<tr>
<th>Importance</th>
<th>Furthest from World-Class</th>
<th>At or near World-Class</th>
</tr>
</thead>
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<tr>
<td>Average Importance</td>
<td>64.9%</td>
<td>35.1%</td>
</tr>
<tr>
<td>Important</td>
<td>15.6%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Somewhat Important</td>
<td>22.6%</td>
<td>15.7%</td>
</tr>
<tr>
<td>Not Important</td>
<td>26.7%</td>
<td></td>
</tr>
</tbody>
</table>
```
Green/Sustainability (GS)

Current Progress

- In assessing the measurement system for reviewing return from green/sustainability efforts in their companies, more than 8 out of 10 manufacturers (86.8 percent) are using a system that is furthest from world-class. Only a little more than one tenth of manufacturers (13.3 percent) are using measurement systems at or near world-class.

What best describes your measurement system for reviewing return from Green/Sustainability efforts?

Expanded descriptions:

1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization
Green/Sustainability (GS)

- This same pattern is mirrored in their perceptions of relative progress toward world-class performance across the benchmarks of this Next Generation Manufacturing success attribute. Here, 80 percent of manufacturers rate their progress as furthest from world-class, while 20 percent rate their progress at or near world-class. Actual performance across the benchmarks of this success attribute closely parallels perception in some cases. In others, actual performance is measurably lower.

Rate your organization’s progress toward world-class Green/Sustainability:

- For example, in describing what percentage of products (by sales volume) are completely recyclable/reusable, over three quarters of manufacturers (78.1 percent) report progress that is furthest from world-class, while less than one-quarter (22 percent) report progress at or near world-class.

What percentage of your products (by sales volume) are completely recyclable/reusable?
Green/Sustainability (GS)

- Among other key benchmarks, however, the performance gap widens much further. In assessing the measurable reduction in energy per unit of product output, more than 9 out of 10 manufacturers (97.4 percent) report performance at levels furthest from world-class, and less than 3 percent report performance at or near world class.

What is your annual reduction in energy per unit of product output?

![Bar chart showing reduction in energy per unit of product output.]

- Similarly, performance in annual reduction in the use of non-recycled material per unit of product output shows that the large majority (94.2 percent) of manufacturers are performing at levels furthest from world-class, while only a small minority (5.9 percent) is performing at or near the world-class benchmark.

What is your annual reduction in usage of non-recycled material energy per unit of product output?
Green/Sustainability (GS)

What Does it Mean?
Manufacturers’ performance across these green/sustainability benchmarks is notably low and corresponds closely to both their awareness of its importance and their perceived progress toward becoming world-class. Some suggest that the manufacturing sector is just “waking up” to the growing importance of this success attribute, which would account for generally low performance. Yet, at least two thirds of manufacturers in the study already recognize the importance of world-class performance in this attribute to their business success over the next five years. The data suggests the awareness of importance is now in place but is not growing fast enough, and actual progress lags far behind.

The demand for green/sustainability excellence—from customers, OEMs, policymakers and regulators—is impacting U.S. manufacturers with growing force, and this pressure is expected to increase substantially in the near future. America’s manufacturers must prepare to manage this trend by being proactive, not reactive. Manufacturers do not have luxury of waiting until they feel ready to respond, because the forces driving demand for environmentally responsible manufacturing are increasing in number and power every day. U.S. manufacturers must begin to take aggressive steps toward green/sustainable manufacturing now, or they will suffer negative impacts to their revenues, profits, brand and reputation that may be irreversible.
Global Engagement (GE)

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

To be truly competitive through 2015 and beyond, America’s manufacturers will need to engage and leverage wider and deeper networks of resources, talent and business capabilities. This network will create a whole that is greater than the sum of its parts, that allows manufacturers to extend their geographic reach, build productive and lasting alliances and increase agility to respond to business volatility, increasing market complexity and customer segmentation. Demand, investment and consumption will be centered in the newly emerging economies, and will be powered by profound demographic shifts from the Western and Northern Hemispheres to the Eastern and Southern Hemispheres. To connect to these new centers of customer demand – where the drivers of future growth will come from - small and midsize manufacturers, in particular, will need to master more advanced strategies and tactics around this NGM success attribute. Companies that build robust networks described here, will gain key competitive advantage over companies that cling to conventional business models and become increasingly isolated in the global economy.

Awareness

By comparison, Global Engagement ranks remarkably low in the strategic priorities of U.S. manufacturers surveyed, with more than one third (36.2 percent) ranking it not or somewhat important to their success over the next five years. Only half (46.3 percent) of manufacturers believe global engagement is important to highly important. This lack of awareness is reflected in the assessment of progress toward world-class performance benchmarks, as seen in the following section.

Rate the importance of global engagement to your organization’s success over the next five years:

![Graph showing the importance of global engagement to organizational success](chart.png)
Global Engagement (GE)

Current Progress

- Around 8 out of 10 manufacturers (80.7 percent) describe their measurement systems for reviewing return from global engagement as being furthest from world-class. Only about 1 in 5 (19.2 percent) describe these measurement systems as being at or near world-class.

What best describes your measurement system for reviewing return from global engagement?

![Bar Chart]

Expanded descriptions:
1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization
Global Engagement (GE)

- A comparable relationship appears when manufacturers rate their progress toward becoming a world-class global player. Here, three quarters of manufacturers (75.3 percent) rate their progress as furthest from world-class, and one quarter (24.6 percent) rate their progress as at or near world-class.

Rate your organization’s progress toward becoming a world-class global player:

- Likewise, the dominant majority of manufacturers have registered international sales growth furthest from world-class status. Nine out of 10 manufacturers (92 percent) achieved a percentage change in dollar volume of sales growth outside the U.S. that is furthest from world-class, and less than 1 in 10 manufacturers (8 percent) have achieved performance at or near world-class in this benchmark.

By what percentage has dollar volume of sales outside the United States changed over the past three years?
Global Engagement (GE)

- Similar performance is found when describing how many countries outside of the U.S. these manufacturers operate in or have partner production facilities. Here, 87.9 percent of manufacturers are performing at levels furthest from world-class; only 12.2 percent are performing at or near the world-class benchmark.

In how many countries outside of the United States does your organization operate or partner in production facilities?

![Bar Chart: Furthest from World-Class: 87.9%, At or near World-Class: 12.2%]

- Moreover, 82.9 percent of companies are performing furthest from the world-class benchmark in the number of countries outside the U.S. where they have sales and/or distribution facilities. Only 17.1 percent are performing at or near world-class.

In how many countries outside of the United States does your organization have sales and/or distribution facilities?

![Bar Chart: Furthest from World-Class: 82.9%, At or near World-Class: 17.1%]
Global Engagement (GE)

What does it mean?
Performance in these benchmarks is the lowest among all of the Next Generation Manufacturing success attributes. This reflects historic—and current—patterns in a U.S. manufacturing sector that is dominated by domestic commercial activity. However, the source of new future demand, investment and market growth opportunities in the globalized economy, will be in Asia and South America.

The massive demographic shifts in population growth, lower median age, income and spending power mean that while North American and European markets are maturing and have experienced low single-digit growth for the last ten years, the emerging economies are growing at much higher rates. Most of these countries have high export rates to the U.S., but the reverse is true for the U.S. manufacturing sector and that is strongly reflected in the results of this study.

In a competitive global economy, that is becoming more tightly connected every day, U.S. manufacturers can no longer afford to make and sell in the US alone if they expect to compete and grow.

In a competitive global economy that is becoming more tightly connected every day, US manufacturers can no longer afford to make and sell in the US alone if they expect to compete and grow. They must learn how to do business in global markets and achieve superior execution with all possible urgency. To accomplish this, they will need to leverage global networks and alliances to obtain the talents, capabilities and resources necessary to build a highly-effective, extended enterprise that is fully connected to a global marketplace.
Customer-Focused Innovation

Delivers new and better customer solutions at a faster pace than the competition.

Customer-Focused Innovation will drive a culture, organization, metrics, partnerships and investment focused on identifying and translating customer needs into new product and service offerings. **Today’s world-class product development will be standard practice in 2015.** Next Generation Manufacturers will streamline the delivery of new products, services or integrated solutions, outpacing the competition. Business growth and profitability will be achieved by meeting increasingly complex and segmented customer needs.

### Success Benchmarks

- Rapid and recurring deployment of commercial roll-outs and world-class speed-to-market; systemic innovation across the enterprise in products, services and business processes and practices, including staff and partners
- Utilizes unique customer solutions driven by robust market intelligence
- Focuses staff, metrics and investment on product research, development and deployment

Advanced Talent Management

Gains competitive advantage through best practices in talent recruitment, development and retention.

The ability to hire and harness a highly productive workforce will pose increasing challenges as demographic shifts result in the availability of fewer highly-skilled and experienced workers. Manufacturers will source talent globally and increase retention by offering highly-effective programs to train, educate and challenge employees. Employees will become the core asset that drives the business. This diverse, empowered workforce enables businesses to anticipate and adapt to rapid change, practice continuous improvement and increase productivity while accepting accountability for business outcomes.

### Success Benchmarks

- Mines talent and skill recruitment from diverse sources; leverages diversity as a business asset
- Commits to continuous investment in training and education of employees and partners
- Pushes decision-making authority and accountability down through the organization to drive continuous improvement and employee engagement
- Focuses staff, metrics and investment on human capital development and retention
Appendix A

Systemic Continuous Improvement

*Achieves recurring enterprise-wide productivity gains that exceed the competition.*

Increased global manufacturing competition and the widespread acceptance of lean and quality implementation mean that annual productivity gains considered world-class today will be standard practice in 2015. Companies achieving NGM benchmarks will drive annual productivity gains of 15% or more to retain market position in the new era of hyper-competition. Excellence in business execution is fueled by continuous, company-wide quality improvement resulting in enhanced business performance and customer satisfaction. The greater agility will stabilize profitability by increasing responsiveness to fluctuations in demand.

**Success Benchmarks**

- Continuously measures performance against world-class benchmarks
- Builds an enterprise-wide culture of a continuous improvement methodology
- Measures continuous improvement at every level and throughout the extended enterprise
- Invests in technology and training to drive continuous improvement

**Extended Enterprise Management**

*Leverages a flexible network of suppliers and partners to provide competitive advantages of speed, cost and quality.*

Manufacturing continues to disaggregate into sets of internal and external providers of niche functions, such as material suppliers, logistics, accounting, transportation and R&D. The NGM of the future will leverage the extended enterprise for competitive advantage by fully exploiting the capabilities of expanded networks to gain access to new markets, and to acquire advanced business capabilities, resources and intelligence. This practice will dramatically raise the NGM’s flexibility and market penetration without significant increase in costs, workforce or infrastructure. Such companies will break apart their value chains, along with the costs and assets contained in them, and rebuild them in re-aggregated networks of lower cost/higher quality suppliers that deliver increasing value and satisfaction to customers. NGM manufacturers will also view government assets and public resources as partners in their extended enterprise.

**Success Benchmarks**

- Breaks apart and rebuilds value chains to create better products/services at lower cost while creating new business capabilities
- Establishes a trusted network of partners and suppliers primed to capitalize on opportunities faster than the competition
- Maintains open and continuous communication across the extended enterprise
- Engages suppliers and partners in strategic planning, sharing of customer and competitor information, and response to new opportunities
- Institutes and utilizes metrics and processes for improving extended enterprise performance
Appendix A

Sustainable Product and Process Development

Integrates environmental best practices into company operations and product development to maximize competitive advantage.

In the next 10 years, manufacturers will radically reduce their energy and raw material use and the waste by-products of production. Rising input costs and resource competition make leaner and lower-impact production processes essential. Consumers, governments and entire societies will increasingly reward producers with low environmental impact and punish those that are late adopters of “green” and “sustainable” manufacturing methods. What’s more, reaching NGM benchmarks for environmental impact will become both a competitive differentiator and competitive advantage. There will also be many rapidly emerging “green field” opportunities for companies that develop and deliver innovative “green” solutions to this quickly expanding market.

Success Benchmarks

- Understands that free market mechanisms reward environmentally sound business practices
- Invests in technologies, production methods and business processes that create resource/cost savings and drive market share
- Builds green and sustainable practices that are best insurance for business continuity and also gain community, employee and social support
- Anticipates and responds proactively to future regulation that penalizes inefficient and wasteful resource use
- Invests in training and technology that reduces material and energy use
Global Engagement

Secures business advantages through people, partnerships and systems capable of engaging global markets, talent and resources.

The world market for manufactured goods is increasing at 10-15% per year while the US demand for manufactured goods is increasing at 3-5% per year. The most rapid growth of competitors is coming from overseas. The manufacturer of 2015 will operate in a fully global environment and will need a global sell/source strategy to succeed. The successful NGM will be proactive and engaged globally as a means to drive growth and profitability.


Success Benchmarks

- Anticipates the threats and opportunities presented by globalization and creates offensive/defensive capabilities in response
- Engages in multiple foreign markets for export, sourcing and partnership opportunities
- Develops and utilizes processes that identify global opportunities and threats
- Engages staff and develops partnerships capable of successfully operating in foreign markets
- Leverages partnerships/alliances for maximum market penetration, complementary business capabilities, business intelligence and opportunity identification
Appendix B

Methodology
The Next Generation Manufacturing Study was conducted using an online questionnaire. Respondents also had access to a PDF version of the questionnaire that they could complete and mail back as a hard copy. A total of 2,529 manufacturers participated. Most responses were received in February, March, and April 2009; a majority of respondents from Wisconsin participated in a pilot of the NGM Study in late 2008. MEPs in participating states used various techniques to promote study participation. Responses to the NGM Study were received by the Manufacturing Performance Institute (MPI), then entered into a database, edited, and cleansed to ensure answers were plausible, where necessary. Most questions were answered by most respondents; the least-answered question had 1,951 responses.

All respondent answers to the survey are confidential. As an incentive, respondents who provided contact information were offered a copy of a NGM Performance Report, similar to this Data Report. The Performance Report shows their responses next to answer categories of companies with comparable organizational profiles. Respondents who wished to remain anonymous while completing the questionnaire could provide contact information at a separate website and, as their incentive, receive a Data Report.
Profile of NGM Study Companies

The majority of responses to the NGM Study (80%) were received from organizations identified as a “company,” with the other 20% identified as a “division/unit of a larger company.” All manufacturing product categories, as identified by three-digit North American Industrial Classification System codes, were represented within the NGM Study sample; industries with the highest percentage of respondents were fabricated metal product manufacturing and machinery manufacturing, each with 16% of the sample. The NGM Study companies have been in operation for 32 years (median), are staffed with 32 full-time employees (median), and generated annual revenues of $10 million (median).

Which of the following describes your organization?

- National Company............................79.8%
- Division/unit of a larger company......20.2%

How many years has your organization been in operation?

- National Median ......................32
- Average .................................41
- 75th Percentile .........................55
- 25th Percentile .........................19

What are your approximate annual revenues?

- National Median ......................$10,000,000
- Average .................................$159,603,620
- 75th Percentile .........................$30,000,000
- 25th Percentile .........................$3,000,000

How many full-time employees (and equivalents)?

- National Median ......................55
- Average .................................445
- 75th Percentile .........................140
- 25th Percentile .........................21
## Appendix C

### Product Category

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Food Mfg.</td>
<td>3.9%</td>
</tr>
<tr>
<td>Beverage and Tobacco Product Mfg.</td>
<td>0.3%</td>
</tr>
<tr>
<td>Textile Mills</td>
<td>1.1%</td>
</tr>
<tr>
<td>Textile Product Mills</td>
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<tr>
<td>Apparel Mfg.</td>
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<tr>
<td>Leather and Allied Product Mfg.</td>
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<tr>
<td>Wood Product Mfg.</td>
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<tr>
<td>Paper Mfg.</td>
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<tr>
<td>Printing and Related Support Activities</td>
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<tr>
<td>Petroleum and Coal Products Mfg.</td>
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</tr>
<tr>
<td>Chemical Mfg.</td>
<td>7.3%</td>
</tr>
<tr>
<td>Plastics and Rubber Products Mfg.</td>
<td>6.6%</td>
</tr>
<tr>
<td>Nonmetallic Mineral Product Mfg.</td>
<td>2.3%</td>
</tr>
<tr>
<td>Primary Metal Mfg.</td>
<td>8.3%</td>
</tr>
<tr>
<td>Fabricated Metal Product Mfg.</td>
<td>16.2%</td>
</tr>
<tr>
<td>Machinery Mfg.</td>
<td>16.2%</td>
</tr>
<tr>
<td>Computer and Electronic Product Mfg.</td>
<td>10.0%</td>
</tr>
<tr>
<td>Electrical Equipment, Appliance, and Component Mfg.</td>
<td>2.8%</td>
</tr>
<tr>
<td>Transportation Equipment Mfg.</td>
<td>6.5%</td>
</tr>
<tr>
<td>Furniture and Related Product Mfg.</td>
<td>2.6%</td>
</tr>
<tr>
<td>Miscellaneous Mfg.</td>
<td>4.3%</td>
</tr>
<tr>
<td>Other</td>
<td>1.3%</td>
</tr>
</tbody>
</table>