DAKOTA MEP

Next Generation Manufacturing Initiative

dakotaMEP
Maximizing Enterprise Performance

2009 Results

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Introduction

The Next Generation Manufacturing Initiative was developed to better define the strategies and business activities necessary for world-class performance and success into the next generation. More than 2,500 manufacturers across the United States responded to the Next Generation Manufacturing (NGM) Initiative — 67 from Dakota. This summary presents the results of Dakota manufacturers next to responses from all manufacturers nationwide that participated.

The NGM Initiative was coordinated by the American Small Manufacturers Coalition (an association of Manufacturing Extension Partnership centers and partners); conducted by the Manufacturing Performance Institute (MPI); and supported by Manufacturing Extension Partnership centers and partnering organizations in the following states and regions:

- Dakotas (North Dakota and South Dakota)
- Florida
- Illinois
- Kentucky
- Missouri
- New England (Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)
- New Jersey
- Ohio
- Oklahoma
- Pennsylvania
- South Carolina
- Texas
- Wisconsin

The Dakota NGM Initiative was sponsored by Dakota MEP.

The NGM Initiative consisted of a questionnaire that sought to assess manufacturers' awareness of NGM strategies, progress in implementing best practices to support NGM strategies, and success in achieving NGM operational and financial performances. Why? Because forward-looking NGM strategies are likely to drive manufacturing growth and profitability into the 21st century:

- ***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 performance advantage by having superior systems in place to recruit, hire, develop, and retain talent.
- ***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 and talents better than the competition.

The NGM Initiative 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 then reaping the performance improvements that can move them into the next generation. A key first step in any manufacturing improvement initiative is to benchmark and compare performances; the NGM Initiative provides these benchmarks.

The good news in the NGM Initiative is that many manufacturers in the Dakotas and across the U.S. are already being guided by NGM philosophies. The bad news is twofold: First, many manufacturers face a sizeable gap between good intentions (awareness of the importance of NGM strategies) and their ability to implement these strategies through best practices. Second, some manufacturers are not looking to the future (i.e., they don't recognize the importance of these strategies) and, consequently, don't even recognize the growing gap between their current performances and what will be required of them in the years ahead.

Manufacturers need be proactive in implementing NGM strategies. But national, state and local policy-makers must also look for ways to bring awareness of NGM strategies to their manufacturing constituencies — and to help these firms implement NGM strategies more quickly and broadly than their competitors around the globe.

NGM Initiative Highlights

The Next Generation Manufacturing (NGM) Initiative points to a clear path for Dakota manufacturers to succeed in the next generation, offering strategies to improve execution that will result in achieving aggressive new performance goals. Following this path — or ignoring it — will likely mean the difference between success and failure for Dakota manufacturers and U.S. manufacturing in general. NGM Initiative highlights include:

Becoming a Next Generation Manufacturer

Improvements required to compete in the next generation move through two distinct phases: Recognizing the need to improve (i.e., identifying that a given NGM strategy is important), and then executing the NGM strategy by applying best practices and investing in people, equipment, and product and process technologies to bring about positive changes.

Fortunately, most manufacturers have entered the first phase, recognizing the importance of NGM strategies to their business success. Dakota manufacturers identify superior process improvement (70 percent of manufacturers rated it "highly important") and customer-focused innovation (58 percent) as the most important NGM strategies to their firms' success over the next five years. Receiving less attention among Dakota manufacturers were supply-chain management (45 percent); human-capital acquisition, development and retention (39 percent); global engagement (28 percent); and green/sustainability (12 percent).

Unfortunately, recognition that an NGM activity is important doesn't necessarily lead to superior performance or *world-class* status for the strategy. In fact, there's a gap between firms' *recognition* of the importance of NGM strategies and these firms' actual *ability* to achieve superior performances (i.e., the percentage that report "highly important" is well below that reporting themselves as world-class[1]). Some manufacturers have adopted the best practices necessary to achieve high performance in an NGM activity, but many other firms are either unaware of best practices, unable to execute them, or unwilling to try. This is illustrated by stark contrasts in performance.

The NGM Initiative establishes aggressive thresholds for assessing superior performance levels within each of the six categories. The good news is that many Dakota manufacturers are hitting these marks. For example, 11 percent of firms report value-added per employee of greater than $175,000. Yet 30 percent of firms report value-added per employee of less than $75,000. Awakening all Dakota manufacturers to the importance of NGM strategies and helping them develop the practices, acquire the tools, and grow NGM-enabled workforces must be a priority for government and manufacturing associations. Without a nudge and assistance, many firms won't be around in the next generation.

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[1] Each NGM strategy section includes the definition for what is considered world-class for that strategy. This summary 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 (where 1= no progress and 5= fully achieved). Analysis of national data for 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. The group of national manufacturers "at or near world-class status" for each specific NGM strategy is cited throughout this summary to provide a benchmark performance against which to compare manufacturers in the state.

Next Generation Competitiveness

Dakota manufacturers must do more to remain globally competitive. The NGM Initiative finds that manufacturers at or near world-class status for NGM strategies do three things differently than manufacturers furthest from world-class:

- They invest more time and effort into that particular NGM strategy.
- They manage differently, implementing best practices at far higher rates.
- They outperform manufacturers furthest from world-class on a wide array of operational and financial metrics.

Currently, only a fraction of Dakota manufacturers are at or near world-class in any of the six NGM strategies. The good news is that this means that benchmark firms exist for others to emulate. The bad news, however, is that many firms are struggling. For example, many Dakota manufacturers report "no progress" toward world-class status for the strategies.

There was a day when "good enough" might have been good enough for Dakota manufacturers and their markets. Those days are gone. Dakota manufacturers need to make progress toward world-class status or they won't be competing against the world in the next generation.

Size Matters in the Next Generation

Significantly less than half of small U.S. manufacturers (those with less than $10 million revenues) rate themselves as at or near to world-class status in each of the NGM strategies, with the highest percentage occurring for superior process improvement (38 percent). This data indicates that a substantial swath of the U.S. manufacturing base is *not yet at a level necessary to compete* in this economy.

It should come as no surprise that many smaller manufacturers frequently have trouble improving as much or as quickly as larger firms — smaller staffs and scarce resources often limit their capacity for change. Smaller firms were often more likely to believe a strategy was not important, to rate themselves as having achieved *no progress* toward world-class status for a strategy, to have the fewest best practices in place, and to achieve the poorest performances.

Differences in management for small manufacturers nationwide are particularly noticeable regarding the existence of measurement systems and review processes for the six NGM strategies. Smaller firms are more likely to indicate "no measurement system per se or reviews" than larger firms. For example, 38 percent of national manufacturers with revenues of $10 million or less have no measurement system or reviews in place to assess customer-focused innovation vs. just 19 percent of larger manufacturers.[2]

What Gets Measured in the Next Generation Gets Better

What gets measured, gets done. But manufacturers across the country and Dakota don't measure well. The presence of sophisticated measurement systems or review processes is a reliable indicator of an organization's willingness and ability to continuously improve. Yet a surprising number of Dakota manufacturers lack even rudimentary or ad hoc systems or review processes (e.g., "No measurement systems per se or reviews"): for example, 28 percent have no measurements systems or reviews in place to track supply-chain management.

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[2]Data for individual states was not cross-tabulated by size of manufacturers (i.e., revenues) because sample sizes varied dramatically by state. Aggregated national data offers greater statistically relevance.

Similarly, very few manufacturers have the most advanced systems in place ("Regular monitoring and review of company-specific metrics by CEO and senior staff" or "Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization").

How can companies improve without measurement systems? How can they even hope to become world-class and progress into the next generation?

Going Green in the Next Generation?

While the public at large is rapidly embracing Green, few Dakota manufacturers are making a substantial effort to adopt Greener practices and produce Greener products. For example, only 7 percent of manufacturers have been able to annually reduce their energy usage per unit of product by more than 10 percent, and only 17 percent have reduced their use of non-recycled material per unit of product by more than 10 percent. There's also a surprising lack of interest among many in sustainable strategies (18 percent believe it is "not important").

Obviously, manufacturers in Dakota and across the country have a dim view of the importance of implementing green/sustainable strategies in their firms, and increased education, awareness, or market changes will be necessary to increase the importance of Green to the nation's manufacturers. Until these manufacturers open their eyes to the importance of NGM strategies — and how far behind they're falling — they have no chance of improvement or of achieving global competitiveness.

Changing Leadership in the Next Generation

Approximately 24 percent of Dakota manufacturers have a leadership succession planned in the next five years; another 31 percent may have a transition in leadership ("maybe"), meaning that more than half of all manufacturers are already considering their own next-generation leaders. This represents a significant challenge and opportunity for manufacturers over the next five years.

Transforming into a Next Generation Manufacturer requires leadership, consistency in direction, energy, passion and skill. With so many manufacturing leaders expected to exit executive ranks, it will be critical for these firms facing succession — and critical for policy makers who believe in manufacturing — to address this leadership transition while those leaders are currently in place.

Management succession over the next five years will put into place leadership that will either drive the adoption of NGM strategies and superior performance by the manufacturing base — or that will squander an opportunity for global competitiveness. Will companies bring in NGM-focused leaders, or opt for more traditional managers without the awareness, skills and daring to seize the growth and leadership available to them? These choices may determine the fates of thousands of organizations in the Dakotas and across the U.S.

Next Generation Manufacturers Require Support Services

The vast majority of Dakota manufacturers report that assistance in their geographic region — support services, peer groups, training opportunities and resources — exists to some degree in helping them follow through on NGM strategies. But a high percentage believe that "no support" exists. In some regions this may be the case, but it's important to note that other factors may be at play.

Manufacturers nationwide that are at or near world-class status for an NGM strategy are more likely to indicate a stronger level of regional support than their non-world-class peers. This could mean that world-class manufacturers have greater access to support services or it could mean that world-class manufacturers are more likely to seek out and engage regional support services.

One Nation of Manufacturers Looking Toward the Next Generation

The highlights above and NGM findings overall are surprisingly similar across regions of the country and across industries. All face the same pressures to compete, the same needs to implement best practices, and the same requirements for performance. Every manufacturer — regardless of industry or location — must either transform itself into a Next Generation organization or accept permanent second- or third-tier profitability.

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Reading Graphs in This Summary

Graphs in this summary present overall national findings from the NGM Initiative ("National") alongside responses from "Dakota" manufacturers.

Most comparisons of Dakota responses to national responses (all manufacturers that participated, including Dakota manufacturers) within the text throughout this summary (i.e., is the state performing better or worse) have been made by taking into consideration the sample size of participating Dakota manufacturers and the resulting margin of error due to that sample size and Dakota's population of manufacturers: a difference of approximately ±12 points is required for the Dakota data to denote a statistically significant difference.

The group of national manufacturers "at or near world-class status" for each specific NGM strategy is cited throughout summary text portions to provide a benchmark performance against which to compare manufacturers in the state.

The Manufacturing Performance Institute performed the initial analysis for this summary; individual states then had the opportunity to apply their own analysis or to append other materials to this summary.

Profile of NGM Initiative Companies

The majority of Dakota responses to the NGM Initiative (73 percent) were received from organizations identified as a "company," with the other 27 percent identified as a "division/unit of a larger company." The NGM Initiative companies from the Dakotas have been in operation for 28 years (median), are staffed with 55 full-time employees (median), and generated annual revenues of $9 million (median).

Which of the following describes your organization?	National	Dakotas
Company	79.8 percent	72.7 percent
Division/unit of a larger company	20.2 percent	27.3 percent
How many years has your organization been in operation?	**National**	**Dakotas**
Median	32	28
Average	41	33
75th Percentile	55	40
25th Percentile	19	10
What are your approximate annual revenues?	**National**	**Dakotas**
Median	$10,000,000	$9,000,000
Average	$159,603,620	$33,500,000
75th Percentile	$30,000,000	$33,500,000
25th Percentile	$3,000,000	$2,344,660
How many full-time employees (and equivalents)?	**National**	**Dakotas**
Median	55	55
Average	445	133
75th Percentile	140	170
25th Percentile	21	18

Industries with the highest percentage of respondents — as identified by three-digit North American Industry Classification System codes — were machinery manufacturing and fabricated metal product manufacturing, with 24 percent and 18 percent of the Dakota sample, respectively.

Product Category	National	Dakotas
Food Mfg.	3.9 %	6.0 %
Beverage and Tobacco Product Mfg.	0.3 %	0.0 %
Textile Mills	1.1 %	1.5 %
Textile Product Mills	0.7 %	0.0 %
Apparel Mfg.	0.9 %	1.5 %
Leather and Allied Product Mfg.	0.6 %	1.5 %
Wood Product Mfg.	2.8 %	3.0 %
Paper Mfg.	2.5 %	1.5 %
Printing and Related Support Activities	2.4 %	1.5 %
Petroleum and Coal Products Mfg.	0.5 %	0.0 %
Chemical Mfg.	7.3 %	4.5 %
Plastics and Rubber Products Mfg.	6.6 %	6.0 %
Nonmetallic Mineral Product Mfg.	2.3 %	0.0 %
Primary Metal Mfg.	8.3 %	3.0 %
Fabricated Metal Product Mfg.	16.2 %	17.9 %
Machinery Mfg.	16.2 %	23.9 %
Computer and Electronic Product Mfg.	10.0 %	16.4 %
Electrical Equipment, Appliance and Component Mfg.	2.8 %	1.5 %
Transportation Equipment Mfg.	6.5 %	3.0 %
Furniture and Related Product Mfg.	2.6 %	3.0 %
Miscellaneous Mfg.	4.3 %	3.0 %
Other	1.3 %	1.5 %

More than half of Dakota companies responding to the NGM Initiative (54 percent) are led by a chief executive who is older than 50 years old; 13 percent are led by an executive who is older than 60 years old. Approximately 24 percent of Dakota firms anticipate a planned leadership succession in the next five years.

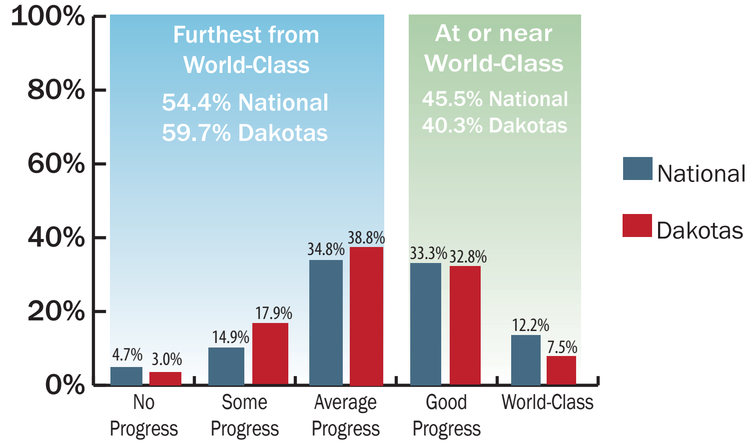
What is the age of your organization's chief executive?	National	Dakotas
<30	0.4 %	0.0 %
31-40	5.7 %	10.5 %
41-50	29.8 %	35.8 %
51-60	40.7 %	40.3 %
>60	23.5 %	13.4 %
Do you anticipate a planned succession of leadership in the next five years?	**National**	**Dakotas**
Yes	24.9 %	23.9 %
Maybe	29.3 %	31.3 %
No	45.9 %	44.8 %

Customer-Focused Innovation

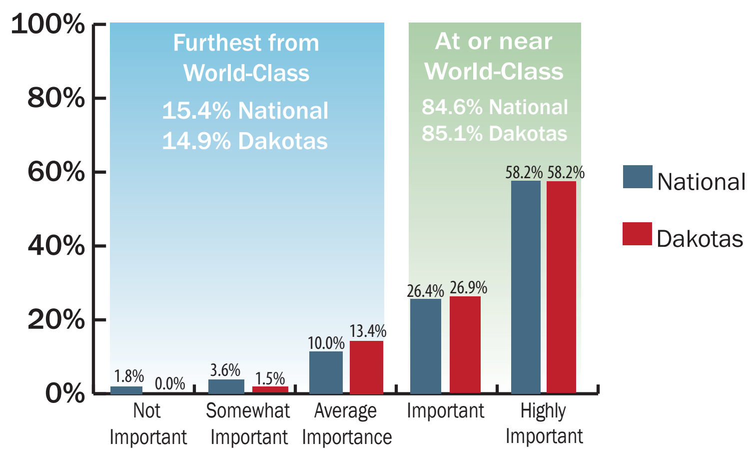
Develop, make, and market new products and services that meet customers' needs at a pace faster than the competition.[3]

Few facets of a business are more critical to next-generation success than customer-focused innovation — the ability to profitably and continually develop new products focused on customers' needs now and into the next generation; few products last more than a few years. Approximately 40 percent of Dakota manufacturers are at or near world-class status in customer-focused innovation (rated 4 or 5), and 3 percent report no progress toward world-class status with this NGM strategy. A majority of Dakota manufacturers recognize how important this NGM strategy is, as 58 percent rate customer-focused innovation as highly important to their organization's success over the next five years. Among all NGM Initiative manufacturers nationwide that are at or near world-class, 72 percent rate customer-focused innovation as highly important.

Rate your organization's progress toward world-class customer-focused innovation:



Rate the importance of customer-focused innovation to your organization's success over the next five years:

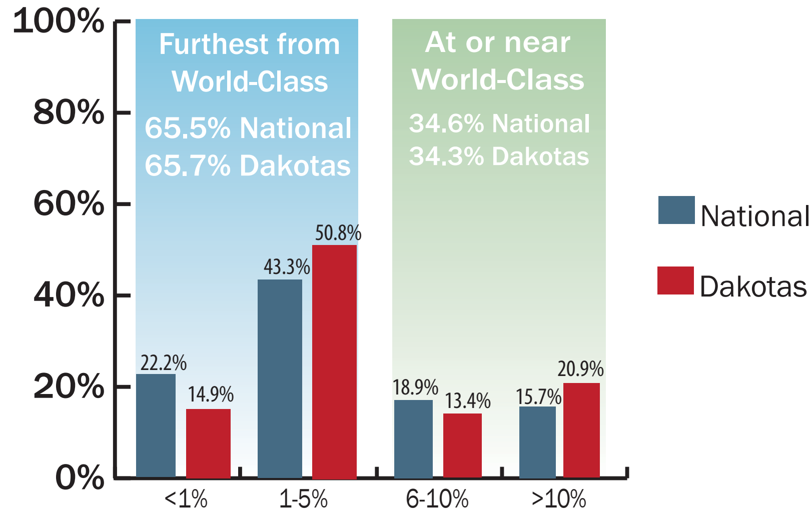


[3]Description of world-class performance.

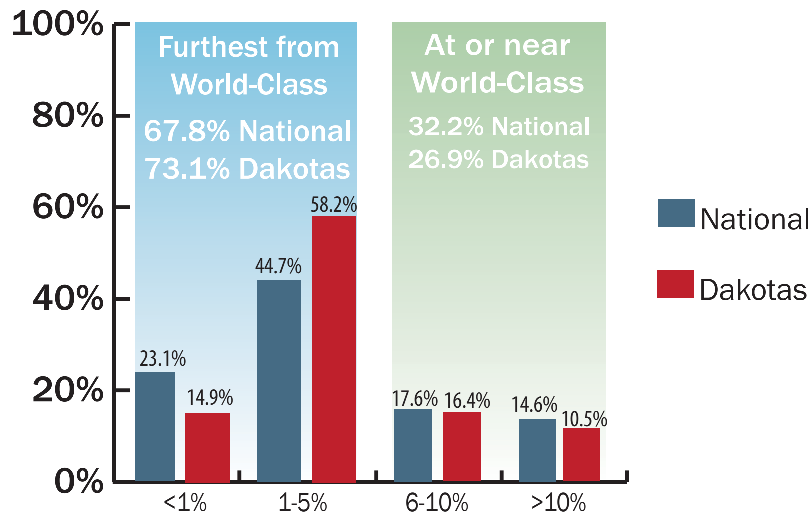
Customer-Focused Innovation

Like the NGM strategies to follow, it's important to support customer-focused innovation with both people and dollars. Yet a high percentage of Dakota manufacturers and manufacturers across the country appear to be doing neither. Fifteen percent have less than 1 percent of their workforce dedicated to product development. Similarly, 15 percent of Dakota manufacturers invest less than 1 percent of sales into product development.

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



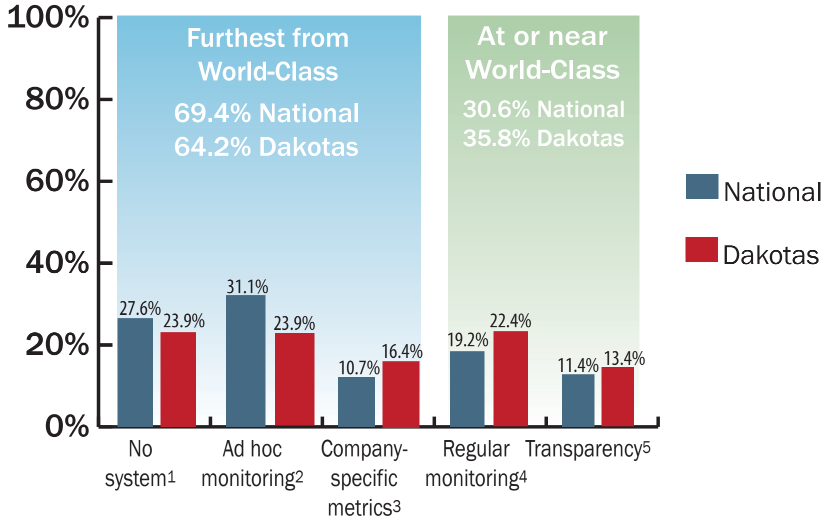
What percentage of sales is invested into new-product development/R&D?



Customer-Focused Innovation

More than one-third of Dakota manufacturers (36 percent) have an advanced measurement system in place for reviewing the return on customer-focused innovation (i.e., "Regular monitoring and review of company-specific metrics by CEO and senior staff" or "Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization"). About 24 percent have no system or reviews in place, prompting the question: If a manufacturer is not tracking product launch success (on-budget, on-time, sales, rejects, etc.), how can it expect to improve innovation processes?

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

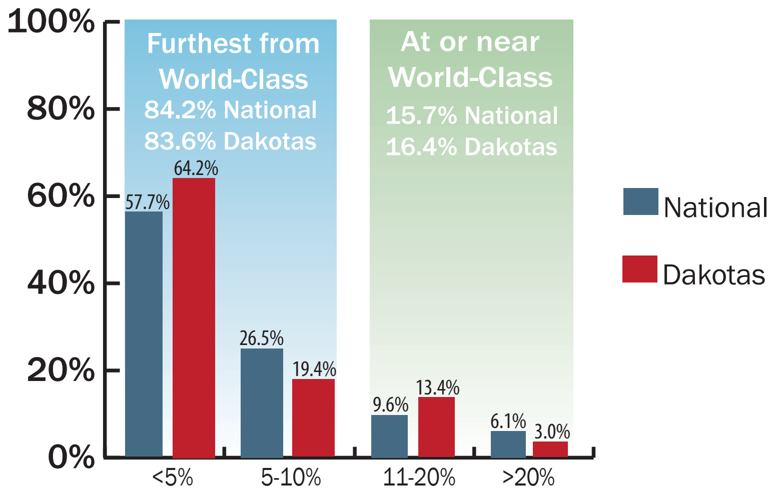


Expanded descriptions:
1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and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

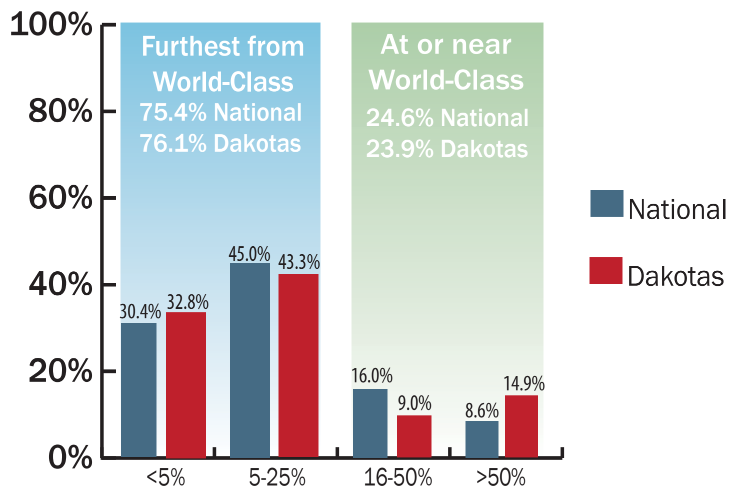
Customer-Focused Innovation

A majority of Dakota manufacturers (64 percent) annually launch fewer than 5 percent of total stock-keeping units (SKUs) as new products. A longer (three years) and different view (sales) of innovation finds that 67 percent of manufacturers derive 5 percent or more of their annual sales from products introduced in the past three years; 24 percent of Dakota manufacturers report that more than 25 percent of sales are from products introduced in the last three years.

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



Approximately what percentage of annual sales are derived from products introduced in the past three years?

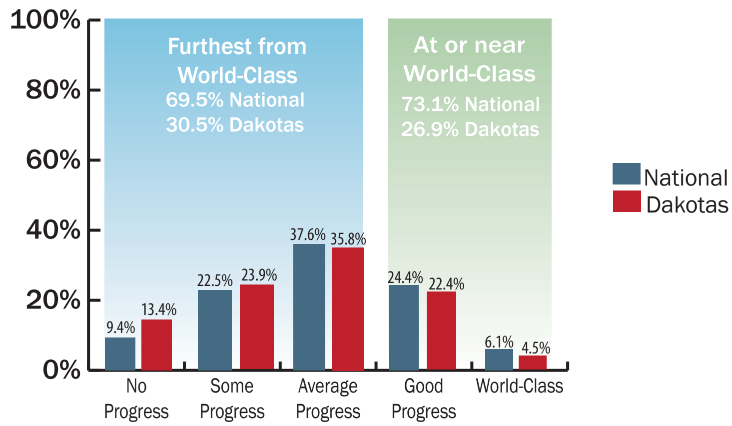


Engaged People/Human-Capital Acquisition, Development and Retention

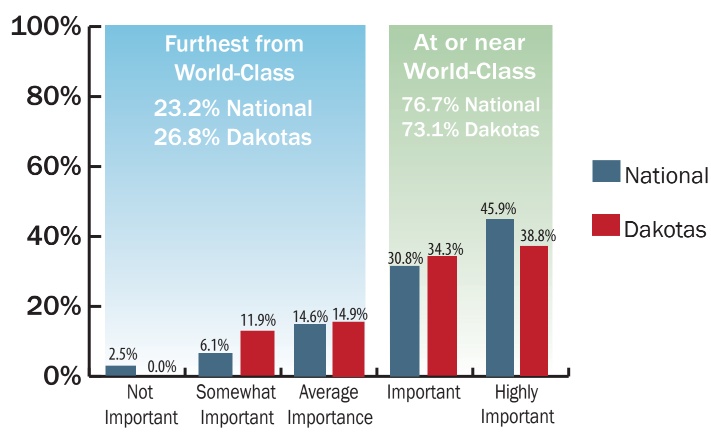
Secure a competitive performance advantage by having superior systems in place to recruit, hire, develop and retain talent.[4]

Approximately 27 percent of Dakota manufacturers are at or near world-class status in human-capital acquisition, development and retention; 13 percent of Dakota manufacturers have made no progress toward world-class status. Surprisingly, fewer than half of Dakota manufacturers (39 percent) rate engaged people/human-capital acquisition, development and retention as "highly important" to their organization's success over the next five years. Seventy percent of national manufacturers at or near world-class status rate human-resource management as important to their firms success.

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



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

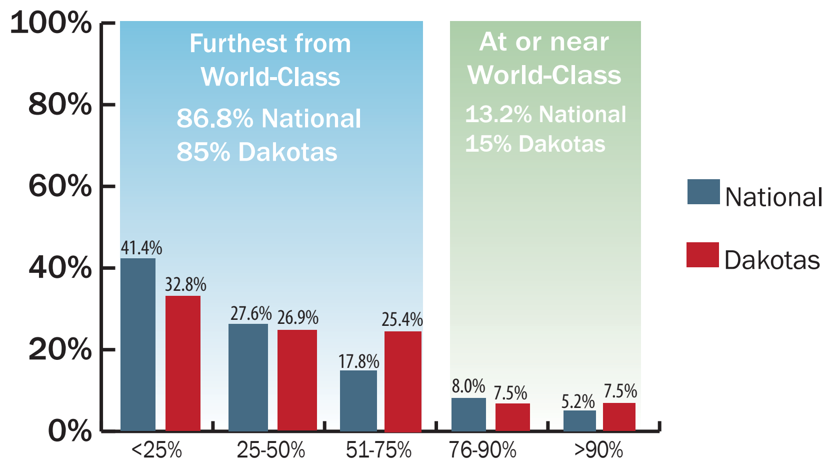


[4]Description of world-class performance.

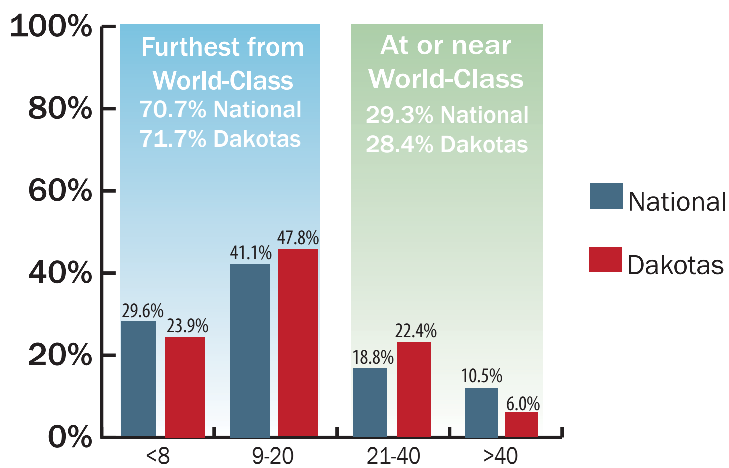
Engaged People/Human-Capital Acquisition, Development and Retention

More than one-third of Dakota manufacturers (40 percent) have a majority of their employees regularly participating in empowered work teams. Yet empowered workers are sparse at many Dakota firms: 33 percent have less than a quarter of their workforces participating in empowered teams. It's important to note that nationwide, half of manufacturers at or near world-class status (50 percent) have a majority of their employees regularly participating in empowered work teams. Training is essential to implement modern manufacturing strategies, yet 24 percent of Dakota manufacturers offer less than eight hours of training annually to employees; six percent offer more than 40 hours. Approximately 19 percent of manufacturers at or near world-class status train more than 40 hours annually.

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



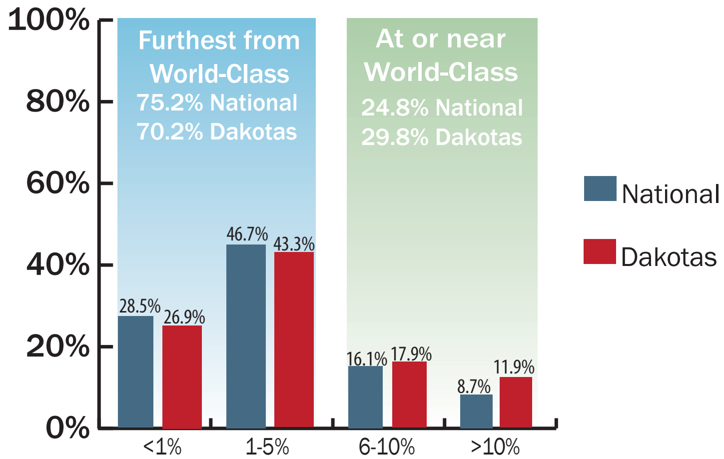
How many formal training hours are devoted annually to each employee?



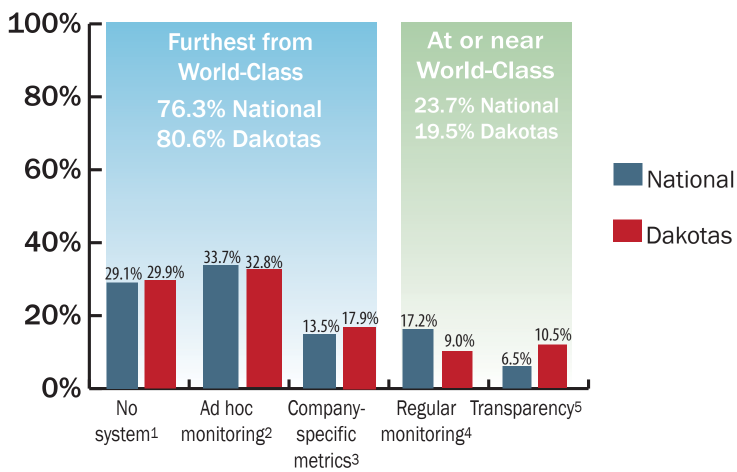
Engaged People/Human-Capital Acquisition, Development and Retention

In order to develop, nurture and hold on to talented individuals, manufacturers must have an adequate HR staff to recruit and hire, manage compensation and benefits programs, coordinate skills and technical training, and manage individual performances. Approximately one-fourth of Dakota manufacturers (27 percent) dedicate less than one percent of employees to assessing and upgrading the talent pool, and similarly, 30 percent have no measurement systems or reviews in place to measure return on HR efforts.

What percentage of employees are dedicated to assessing and upgrading your organization's talent pool?



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
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3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
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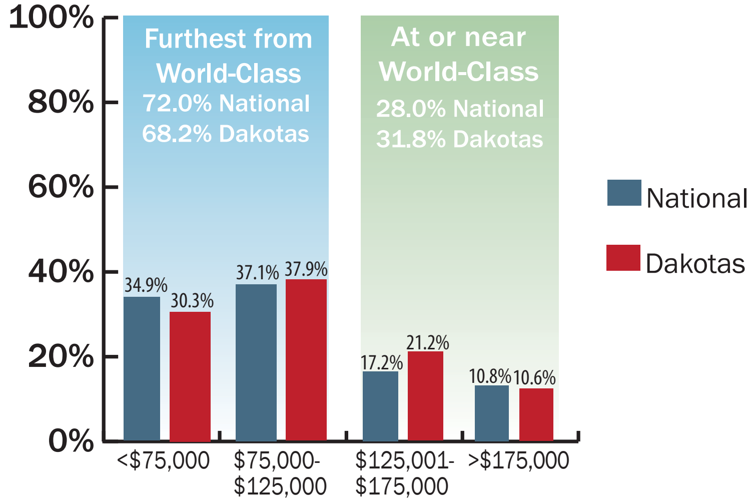
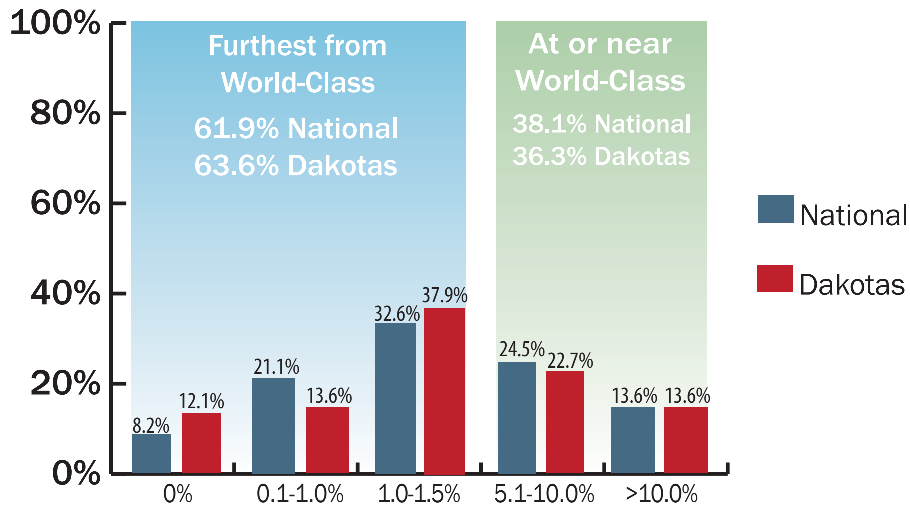
Engaged People/Human-Capital Acquisition, Development and Retention

Two NGM output measures with which to evaluate human-resources effectiveness are value-added per employee (an indicator of labor contribution to product value) and labor turnover (satisfaction of employees with the company, and of management with employees). More than two-thirds of Dakota manufacturers (68 percent) report value-added per employee of $125,000 or lower, and 36 percent report labor turnover of more than five percent.

What is your value-added per employee ([sales - cost of materials] + number of employees)?



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

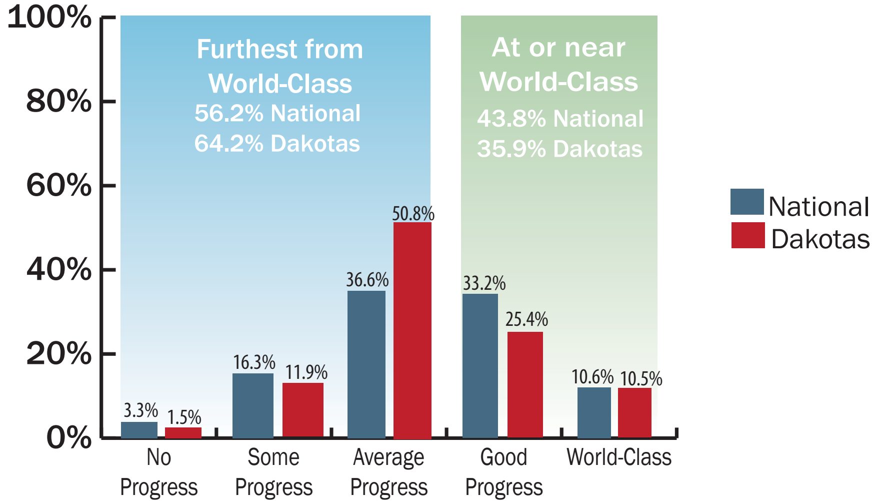


Superior Processes/Improvement Focus:

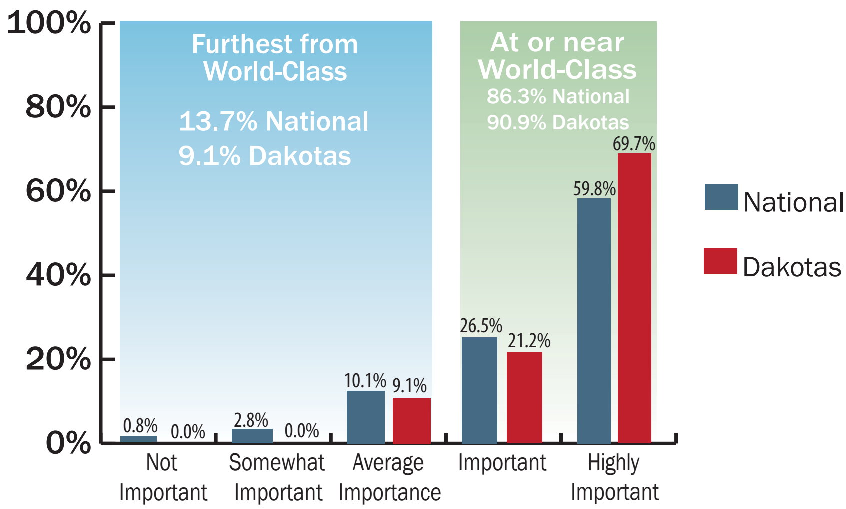
Record annual productivity and quality gains that exceed the competition through a company wide commitment to continuous improvement.[5]

Core to every manufacturer is the capability to produce goods and continuously improve the processes that enable efficient production. About one-third of Dakota manufacturers (36 percent) are at or near world-class status in processes and process improvement. A majority of Dakota manufacturers (70 percent) recognize the importance of having superior processes and a process-improvement focus. Almost three-fourths of national manufacturers (73 percent) at or near world-class status for this strategy view process improvement as highly important to their success over the next five years.

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



Rate the importance of process improvement to your organization's success over the next five years:



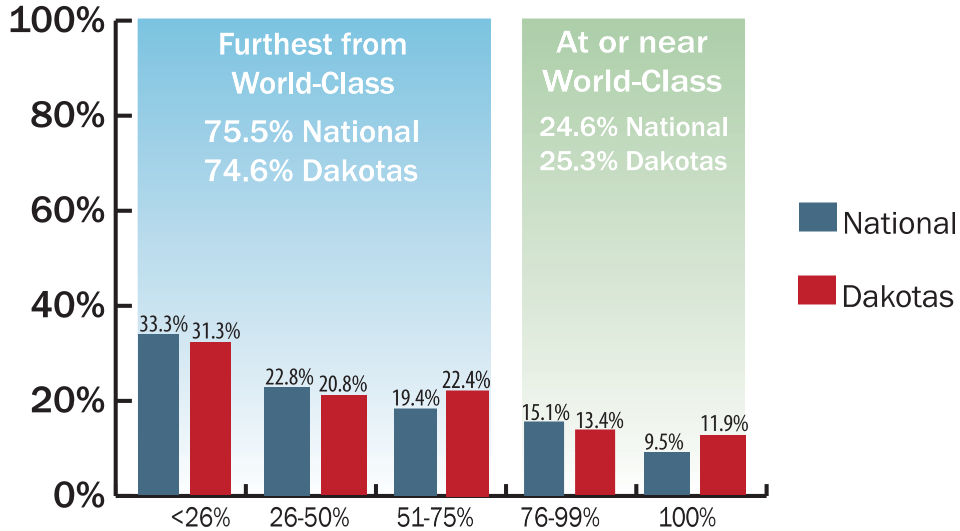
[5]Description of world-class performance.

Superior Processes/Improvement Focus

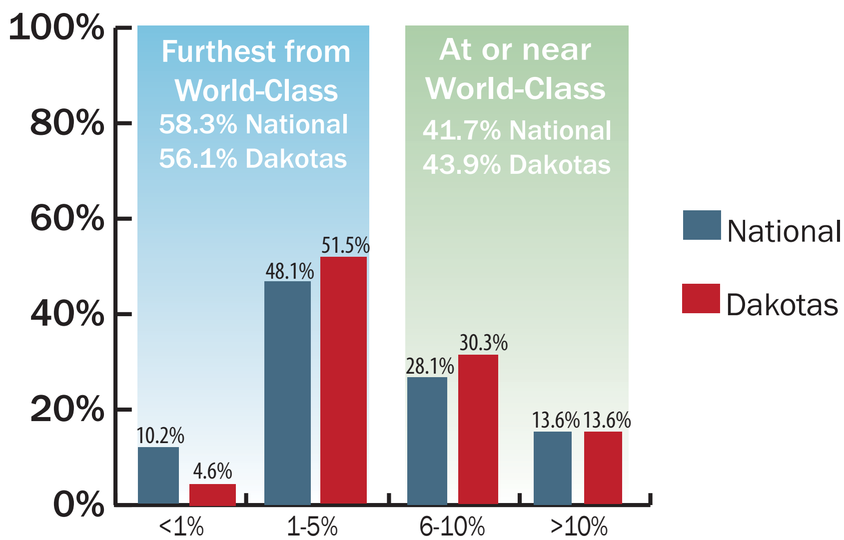
Ideally, everyone in a company is engaged in a company's improvement method or approach, from shop-floor operators, to office staff to sales representatives. Only 12 percent of Dakota manufacturers have 100 percent of their workforces engaged in their improvement approaches; 48 percent of Dakota manufacturers have a majority of the workforces engaged in the improvement method. Two-thirds of manufacturers at or near world-class status (65 percent) have a majority of their workforces engaged in their improvement approaches.

Approximately 56 percent of Dakota manufacturers invest 5 percent or less of sales in capital equipment (three-year average). Half of manufacturers at or near world-class status (50 percent) invest more than 5 percent in capital equipment.

What percentage of your workforce has been fully engaged in your organization's specific improvement method/approach?



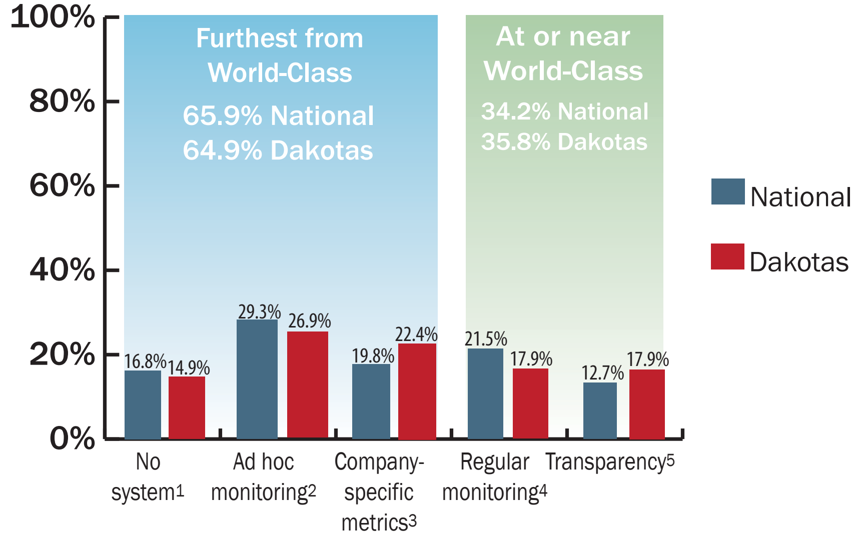
What is your organization's investment in capital equipment as a percentage of sales (three-year average)?



Superior Processes/Improvement Focus

Production performances and metrics are some of the easiest measures for a manufacturer to monitor, yet, surprisingly, 30 percent of Dakota manufacturers have no measurement systems or review processes in place; 36 percent of Dakota firms have either of the two most advanced systems or reviews in place. Approximately 49 percent of manufacturers nationwide at or near world-class status for process improvement have advanced measurement systems and reviews.

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



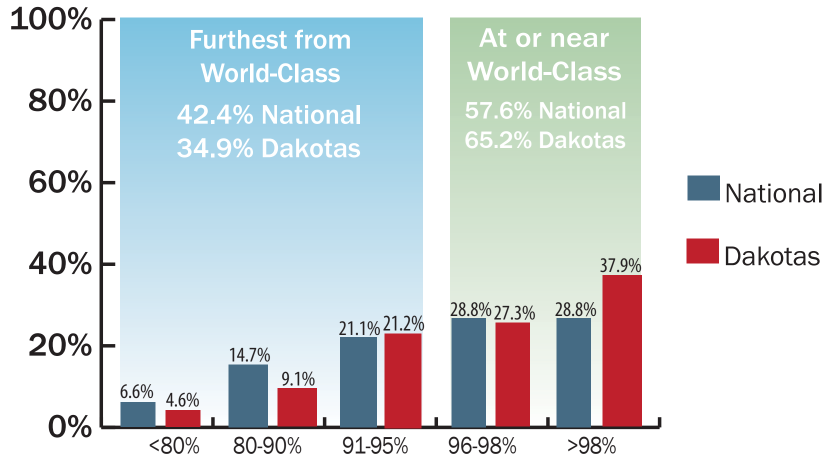
Expanded descriptions:
1. No measurement system per se or reviews
2. Ad hoc monitoring of basic measures and ad hoc reviews
3. Company-specific metrics monitored regularly by operations staff
4. Regular monitoring and review of company-specific metrics by CEO and senior staff
5. Regular monitoring and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

Superior Processes/Improvement Focus

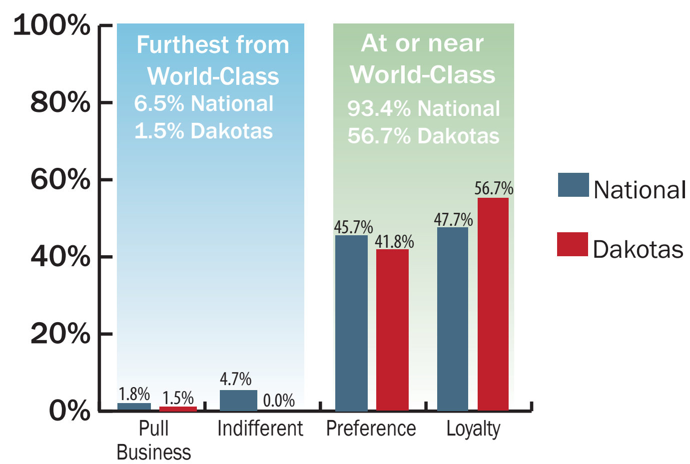
With customers demanding more value from manufacturers along with lower costs, it's imperative that manufacturers focus on "perfect deliveries" (on time, high quality, and to all customers specifications, including labeling and container format); delighting customers; and increasing productivity in the form of value add. Many Dakota manufacturers excel. The following is a comparison between Dakota manufacturers and the national manufacturers at or near world-class status:

- *Perfect deliveries* more than 98 percent of the time: 38 percent of Dakota manufacturers vs. 33 percent of national manufacturers at or near world-class status.
- Highest level of *customer satisfaction*: 57 percent vs. 55 percent.
- Three-year *productivity increase* of more than 50 percent: 24 percent vs. 31 percent.

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

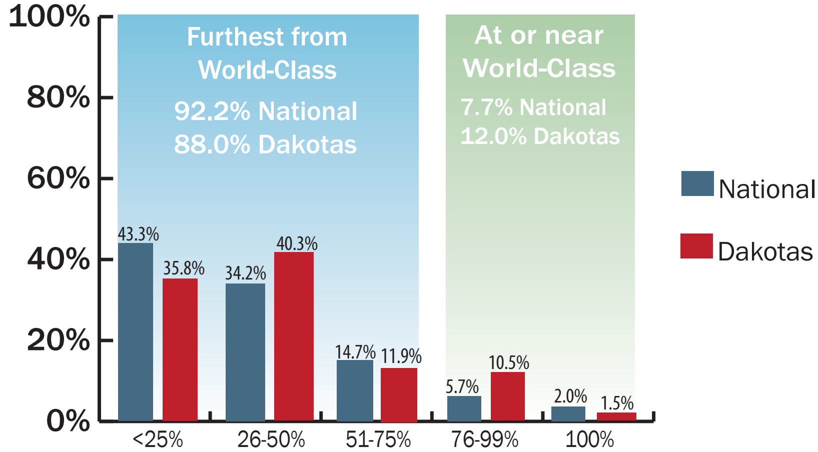


Describe your customers' satisfaction with your overall performance?



Superior Processes/Improvement Focus

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

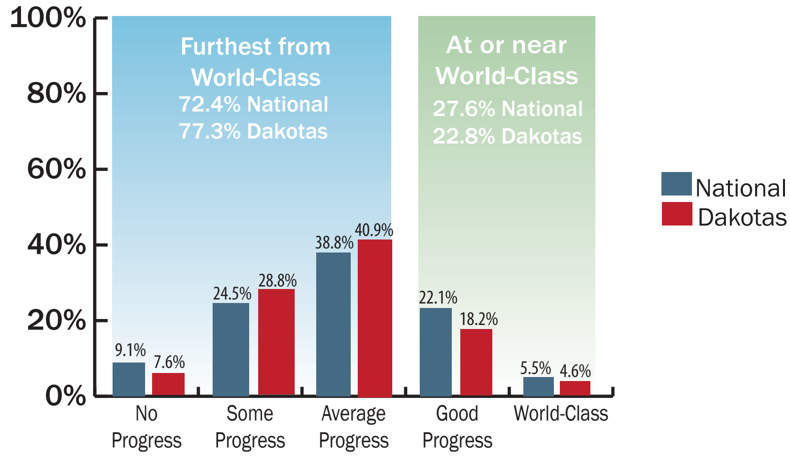


Supply-Chain Management & Collaboration

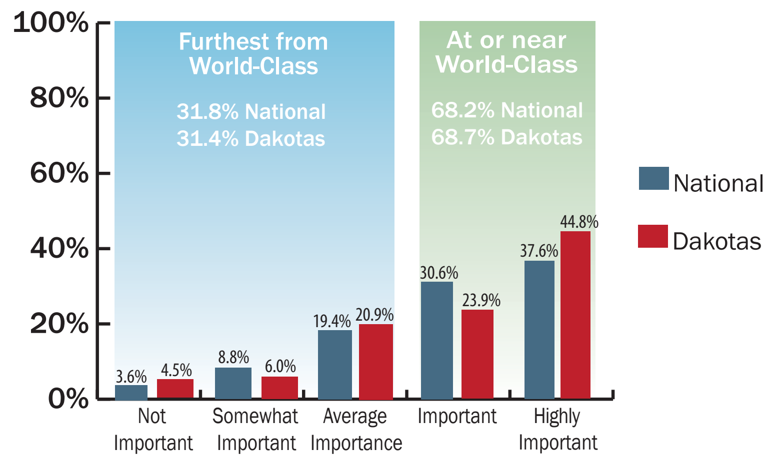
Develop and manage supply chains and partnerships that provide flexibility, response time, and delivery performance that exceeds the competition.[6]

For many manufacturers, managing internal processes and functions is a challenge; managing processes external to the company is even more difficult. For example, only 23 percent of Dakota manufacturers are at or near world-class status for supply-chain management and collaboration. Just 45 percent of manufacturers deem this NGM strategy to be highly important for success over the next generation, which is surprising given that every manufacturer has external supply-chain relations. Again, however, national manufacturers at or near world-class status are far more likely to recognize the importance of this NGM strategy: 61 percent rate it highly important.

Rate your organization's progress toward world-class supply-chain management and collaboration:



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



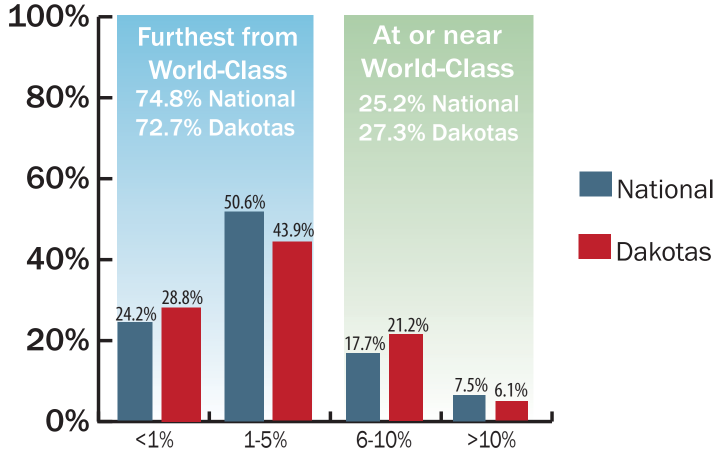
[6]Description of world-class performance.

Supply-Chain Management & Collaboration

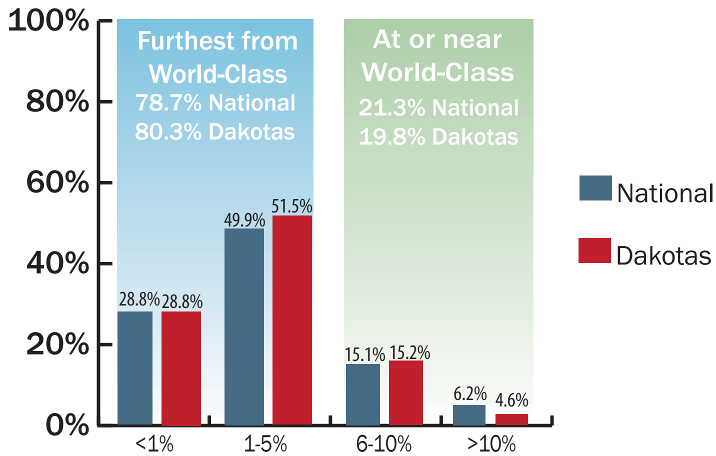
As with other NGM strategies, supply-chain management and collaboration requires:

- Employees dedicated to the strategy: 73 percent of Dakota manufacturers have 5 percent or less of their workforces engaged in supply-chain operations. Approximately 44 percent of national manufacturers at or near world-class status have *more than 5 percent* of their workforces engaged in supply-chain operations.
- Investments: 80 percent of Dakota manufacturers invest 5 percent or less of sales in information technologies (three-year average). One-third of national manufacturers at or near world-class status (34 percent) invest *more than 5 percent* in information technologies.
- Measurement systems: 57 percent of Dakota manufacturers have either no measurement systems or reviews or, at best, ad hoc systems and reviews. Approximately 45 percent of manufacturers at or near world-class status have advanced measurements systems and reviews.

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

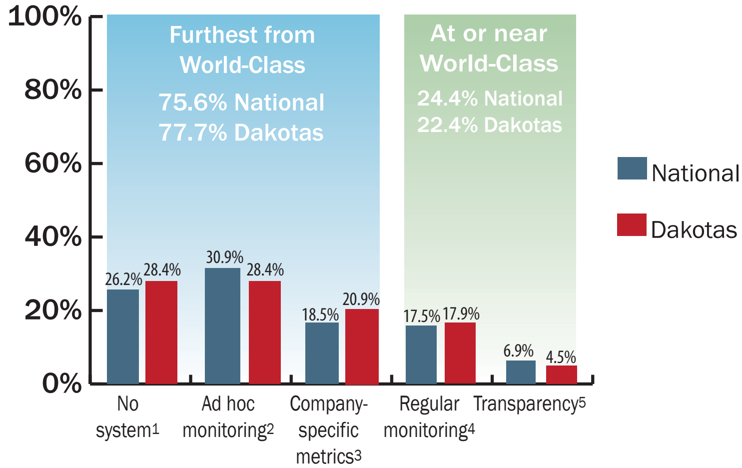


What is your organization's investment in information technologies (hardware and software) as a percentage of sales (three-year average)?



Supply-Chain Management & Collaboration

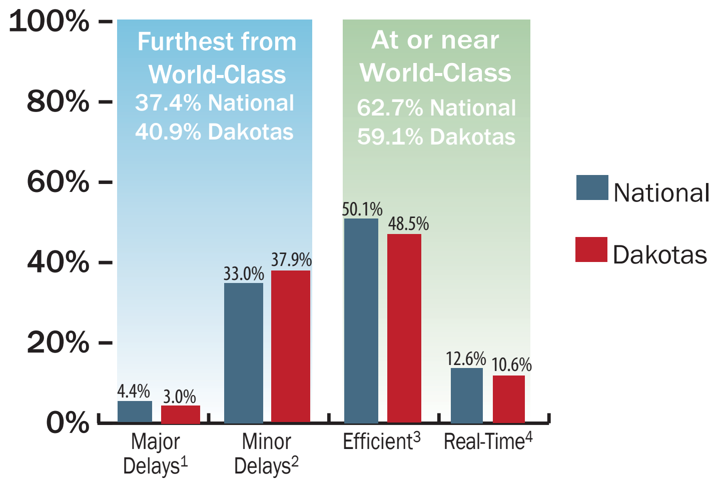
What best describes your measurement system for reviewing return from supply-chain management and collaboration?



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

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



Expanded descriptions:

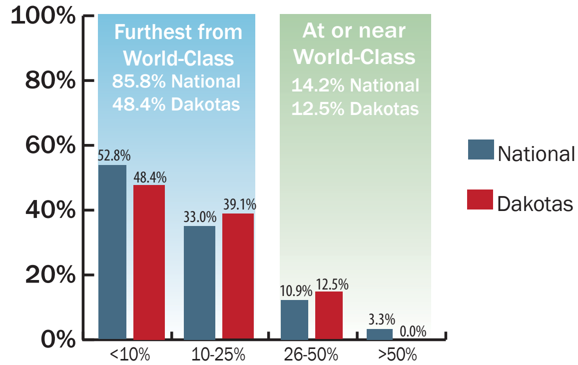
1. Major delays communicating demand signal throughout chain and most suppliers struggle to efficiently meet demand — standard delivery times dramatically exceeded and/or excessive inventory
2. Minor delays in communicating demand signal throughout chain and some suppliers struggle to efficiently meet 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

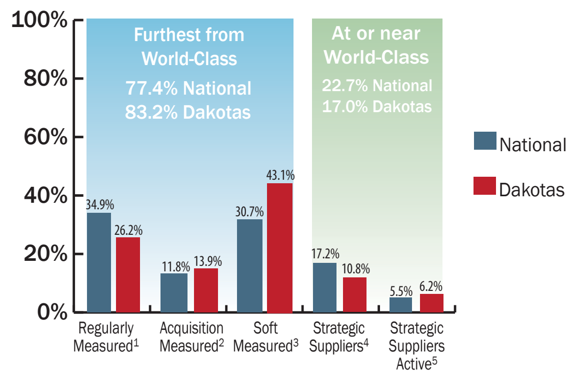
While many firms boast of their ability to control inventories, it's clear that some of this management is merely shifting inventory to suppliers. Approximately half of manufacturers nationwide and Dakota manufacturers (48 percent) report that the total value of inventory in their supply chains has been reduced by less than 10 percent over the last three years.

An important byproduct of reduced inventory in the supply chain is the extended enterprise's ability to quickly respond to customer demand and get new products to market. Few manufacturers describe their supply chains as advanced in this area: fully 17 percent of Dakota manufacturers identified their supply chain as either "Strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts" or "Strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts and participate fully in strategic planning and identifying and responding to new markets." Approximately 41 percent of manufacturers at or near world-class status described their supply chain in these ways.

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



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



Expanded Descriptions:

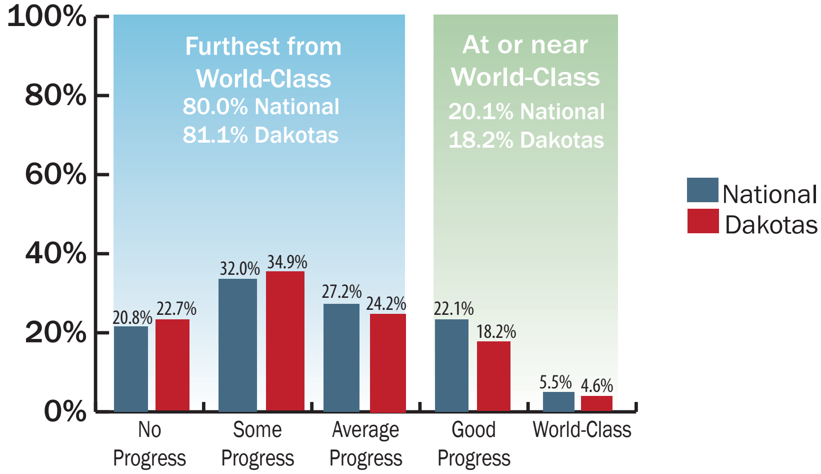
1. Suppliers regularly measured on cost, quality, and delivery performance
2. Suppliers regularly measured on cost, quality, and delivery performance as well as total acquisition cost
3. Suppliers regularly measured on cost, quality, and delivery performance as well as total acquisition cost and "soft" qualities (e.g., trust, flexibility)
4. Strategic suppliers and customers are active participants in our operations, continuous improvement, and product development efforts
5. 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

Green/Sustainability:

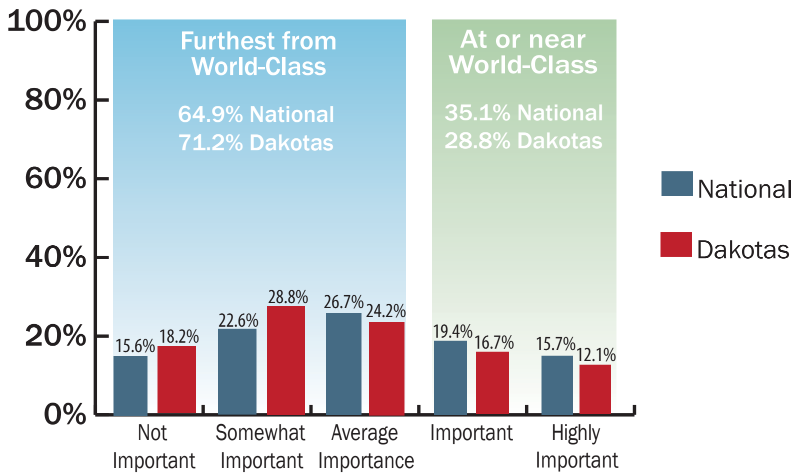
Design and implement waste and energy-use reductions at a level that provides superior cost performance and recognizable customer value.[7]

Very few Dakota or national manufacturers rate themselves at or near world-class status in green/sustainability: Just 18 percent of Dakota manufacturers believe they're at or near world-class status in green/sustainability, which is lower than the 23 percent of Dakota firms that report no progress toward world-class status. Contributing to this is the high percentage of Dakota manufacturers that believe that green is not important (18 percent); only 12 percent believe it's highly important. Yet 50 percent of national manufacturers at or near world-class status in green/sustainability believe this strategy is highly important.

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



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

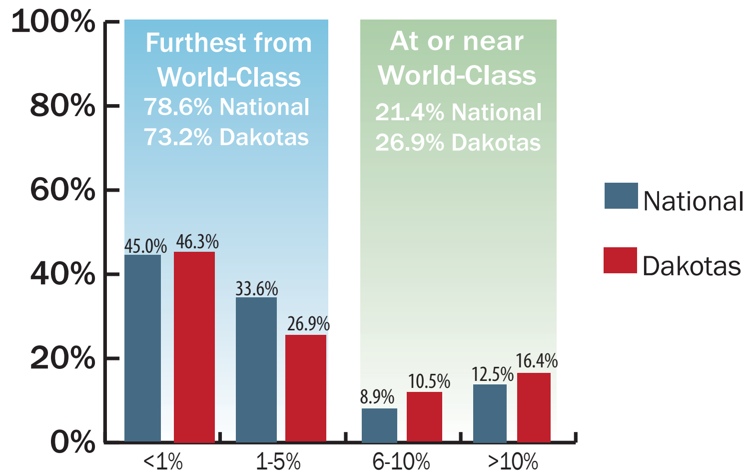


[7] Description of world-class performance.

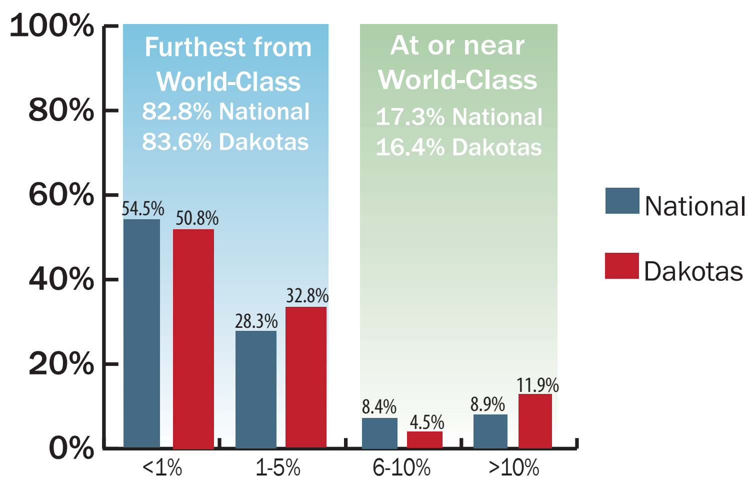
Green/Sustainability

Many Dakota manufacturers have done little to provide the resources to manage green/ sustainability: 46 percent have dedicated less than 1 percent of their workforces to reducing energy, material or emissions in their operations, and 51 percent have less than 1 percent of their workforces dedicated to green products. National manufacturers at or near world-class status are at the other end of the green spectrum: 86 percent have *1 percent or more* of their workforces dedicated to reducing energy, material and emissions, and 82 percent have *1 percent or more* dedicated to green products.

What percentage of your workforce is dedicated to reducing energy, material, or emissions in your operations?



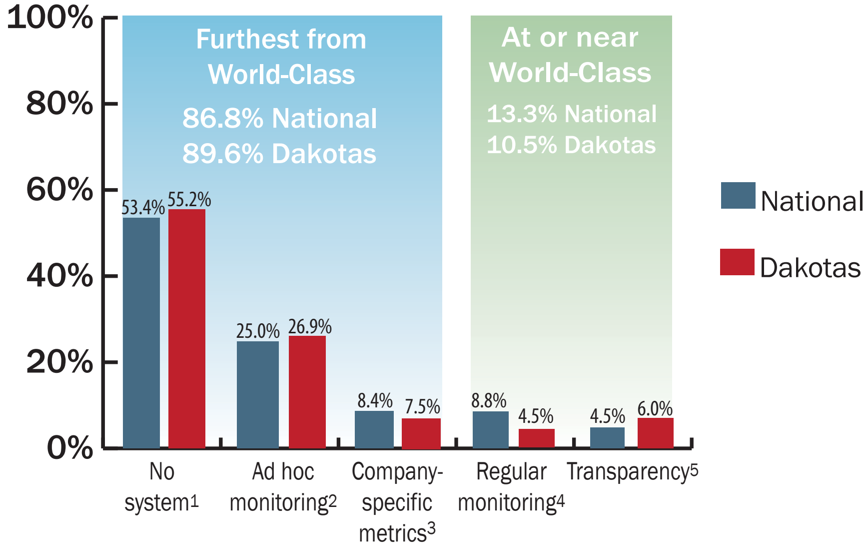
What percentage of the workforce is dedicated to Green products (product and packaging impact, green products and markets)?



Green/Sustainability

Nearly half of Dakota manufacturers (45 percent) have a measurement system or review process of some kind in place to assess return on green/sustainability efforts, and 11 percent have advanced systems or reviews in place — performances comparable to the national data. The perspective from national manufacturers at or near world-class status offers a sharp contrast, though, as 40 percent have advanced systems or reviews in place. With fuel costs rising, energy credits available, and green trade regulations emerging, it's surprising how few Dakota manufacturers are monitoring operations in this area.

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



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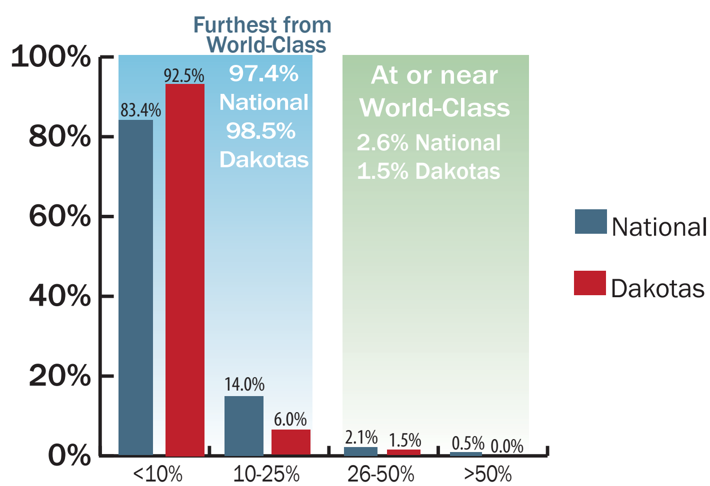
5. Regular monitoring and review of company-specific metrics by CEO and senior staff and transparency and clarity throughout the organization

Green/Sustainability

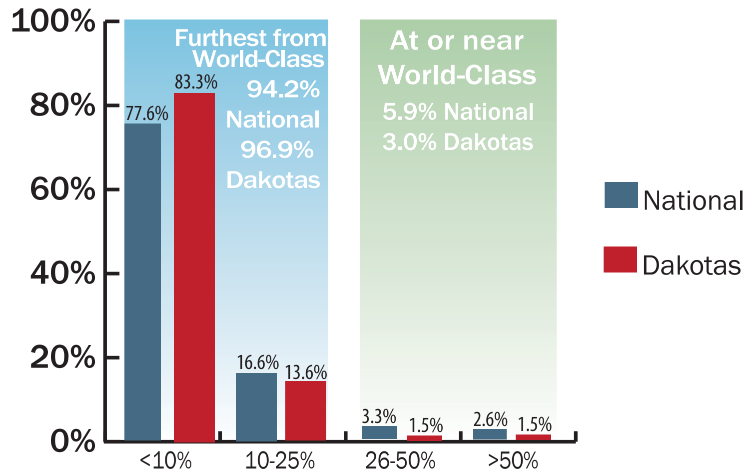
The majority of manufacturers in the Dakotas and nationwide have achieved little yet in the way of green performance metrics, as the following comparisons to national manufacturers at or near world-class green status attest:

- *Energy usage*: 93 percent of Dakota manufacturers have annual reductions of energy per unit of product of less than 10 percent; nationwide, manufacturers at or near world-class status are slightly more successful, with 37 percent reducing energy annually by *10 percent or more* (8 percent with reductions of more than 25 percent).
- *Recycled material*: 83 percent of Dakota manufacturers have annual reductions in the usage of non-recycled material per unit of product of less than 10 percent; 48 percent of national manufacturers at or near world-class status have reduced non-recycled materials annually by *more than 10 percent* (17 percent with reductions of more than 25 percent).
- *Recyclable/reusable products*: 62 percent of Dakota manufacturers report that less than half of their products are completely recyclable/reusable; 59 percent of manufacturers nationwide at or near world-class status report that more than half of their products are completely recyclable/reusable.

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

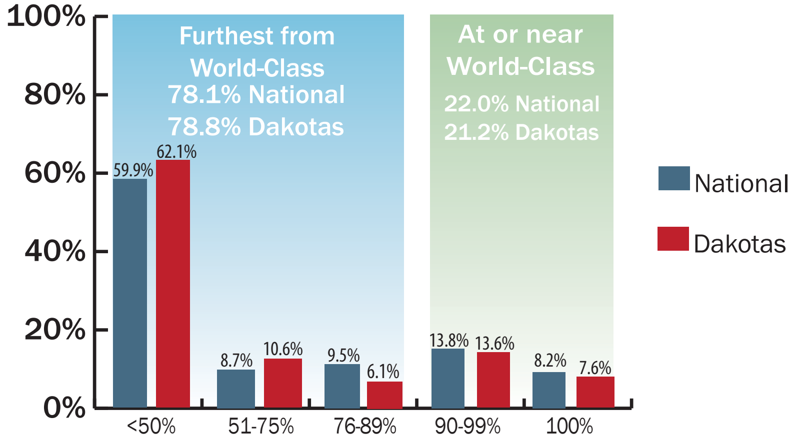


What is your annual reduction in usage of non-recycled material per unit of product output?



Green/Sustainability

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

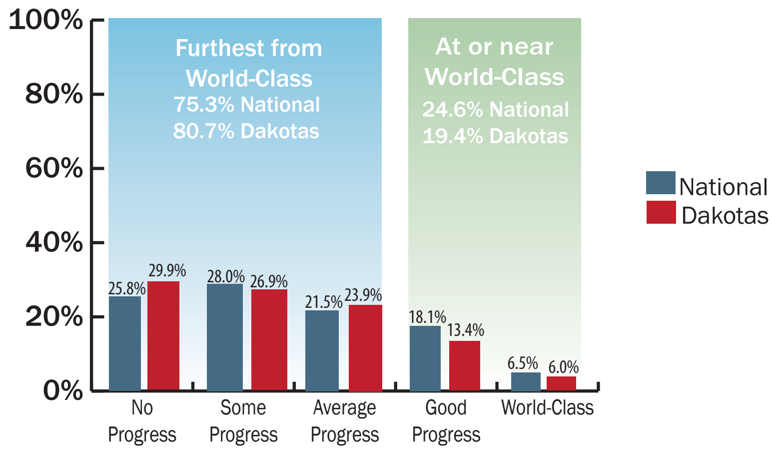


Global Engagement:

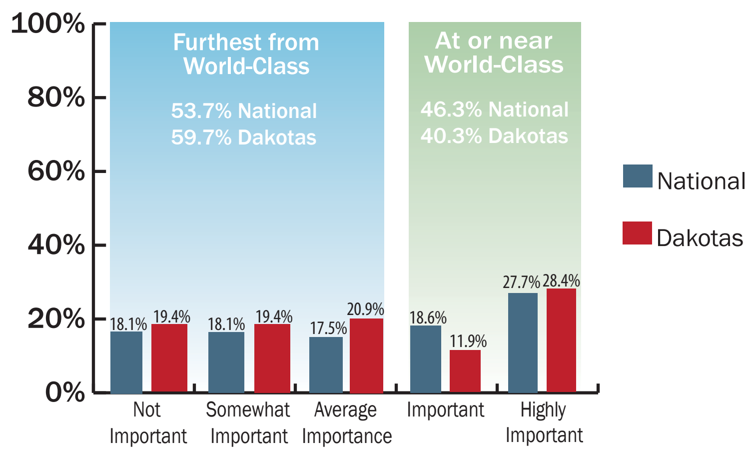
Secure business advantages by having people, partnerships, and systems in place capable of engaging global markets and talents better than the competition.[8]

Approximately 19 percent of Dakota manufacturers consider themselves at or near world-class status when it comes to being a global player, comparable to manufacturers nationwide. And nearly one-third of Dakota manufacturers (28 percent) believe global engagement is highly important. Believing that global engagement is important goes a long way toward achieving world-class status; two-thirds of national manufacturers at or near world-class status rate global engagement as highly important.

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



Rate the importance of global engagement to your organization's success over the next five years.

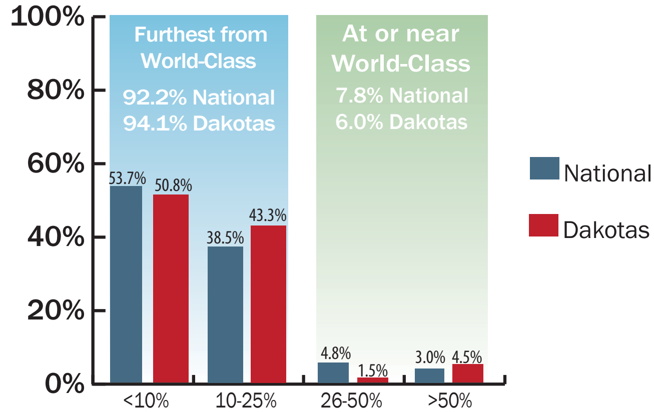


[8]Description of world-class performance.

Global Engagement

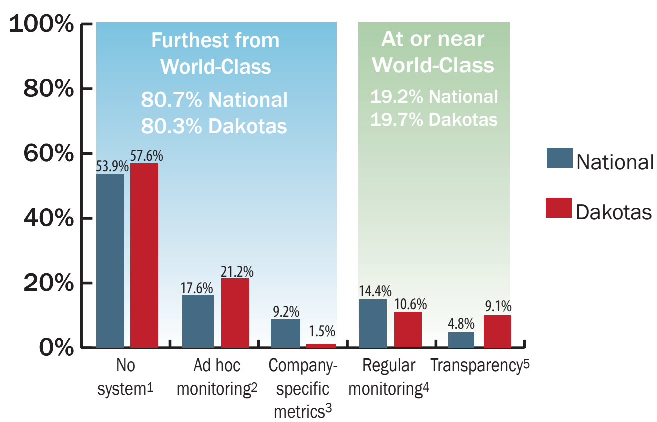
Global engagement requires a workforce in foreign countries or in the U.S. directing international operations: 49 percent have some percentage of the workforce working on global business activities; 82 percent of national manufacturers at or near world-class status have someone dedicated to global business in this manner.

What percentage of your total direct workforce is located overseas and/or located domestically and responsible for global business activities?



Forty-two percent of Dakota manufacturers have measurement systems or review processes in place to assess returns on global engagement; 47 percent of national manufacturers at or near world-class status have the most advanced systems or reviews in place.

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



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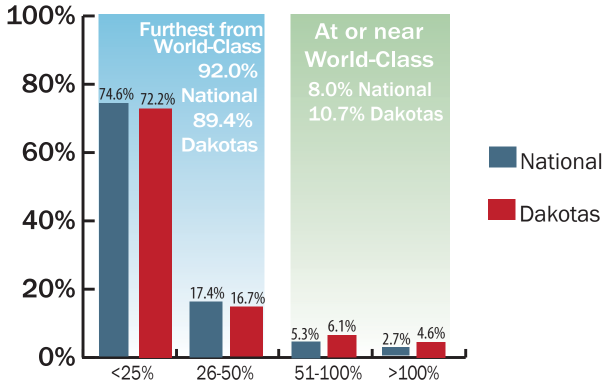
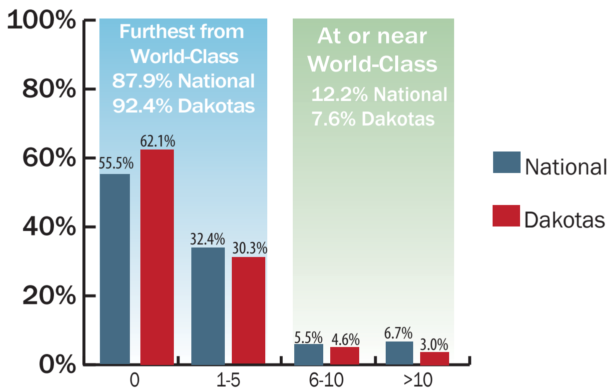
Global Engagement

Global engagement among Dakota manufacturers is comparable to manufacturers nationwide: 27 percent report that over the past three years sales outside the U.S. have increased by 25 percent or more (compared to 25 percent of manufacturers nationwide). Thirty-eight percent of Dakota manufacturers operate or partner in at least one production facility outside the U.S. (compared to 44 percent of manufacturers nationwide), and 43 percent have at least one sales and/or distribution facility outside the U.S. (compared to 46 percent of manufacturers nationwide).

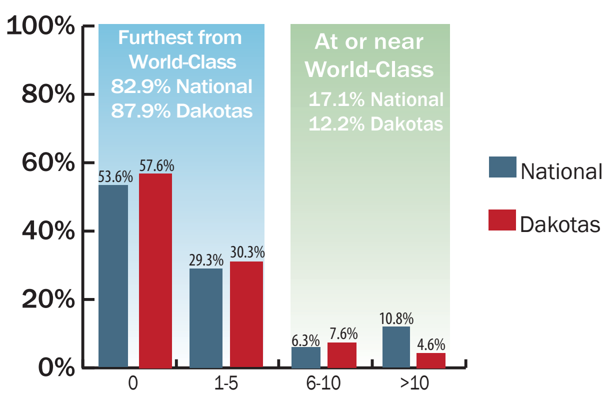
By what percentage has dollar volume of sales outside the United States changed over the past three years?



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



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



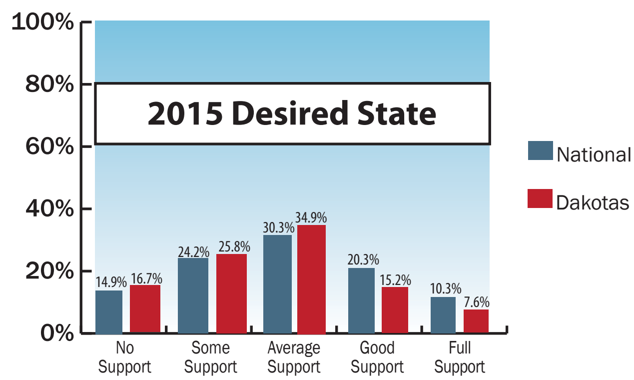
Going Forward

The Going Forward section of the NGM Initiative was developed to assess manufacturers' perceptions of the level of support services, peer groups, training opportunities, and resources available in their state's regions specific to each NGM strategy. Across the country for each NGM strategy, a sizeable percentage of manufacturers believe that "no support" is available. The findings for Dakota manufacturers are comparable to manufacturers nationwide.

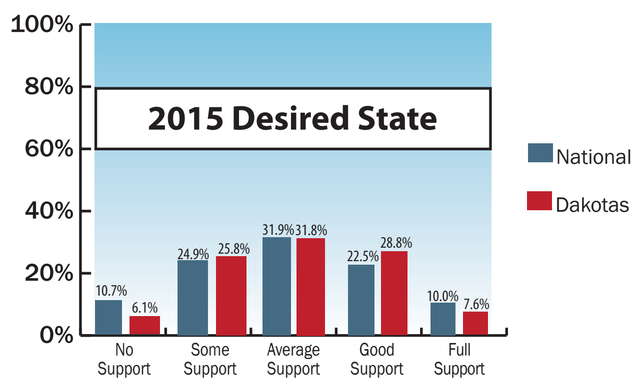
But analysis of national data also shows that awareness of support and actual support may not be synonymous: i.e., manufacturers at or near world-class status were less likely to believe that support was lacking, suggesting that some firms that cite "no support" may not have actually sought it out in the first place.

To what extent does the geographic region in your state have the support services, peer groups, training opportunities and resources available to support the following?

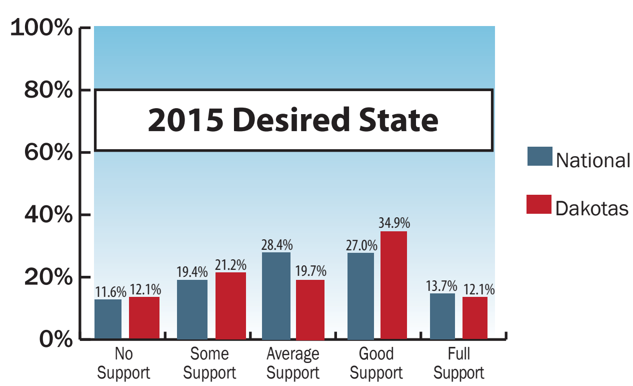
Customer-Focused Innovation



Engaged People/Human-Capital Acquisition, Development and Retention



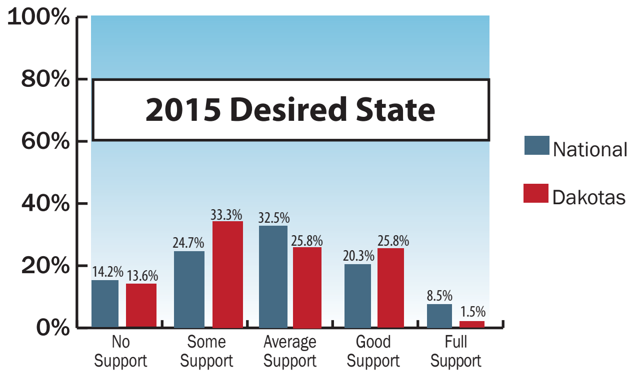
Superior Processes/Improvement Focus



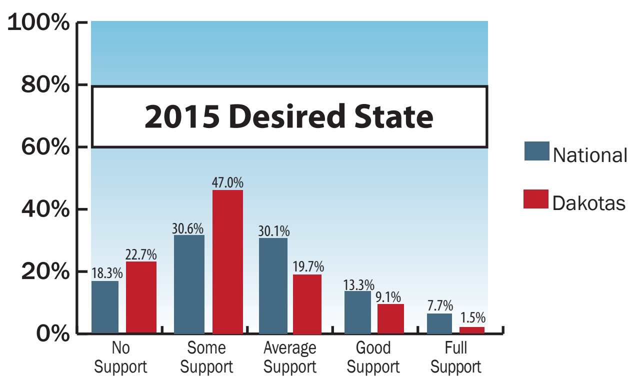
Going Forward

To what extent does the geographic region in your state have the support services, peer groups, training opportunities and resources available to support the following?

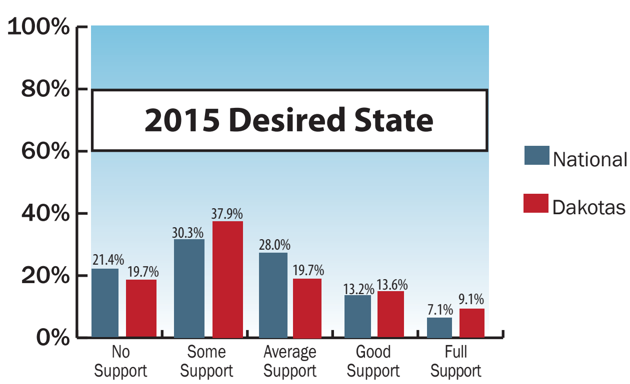
Supply-Chain Management and Collaboration



Green/Sustainability



Global Engagement



Conclusion— Becoming A Next Generation Manufacturer

The business strategies and best practices that comprise Next Generation Manufacturing are familiar to manufacturers, but the focus on these six strategies — and the effort put into implementing associated best practices — varies widely among manufacturers across the country as well as in the Dakotas. Analysis of the entire group of national manufacturers reveals that three differences correlate to dramatic performance differences, juxtaposing "world-class" performance in a specific NGM strategy against the struggles of other manufacturers. Data from the Next Generation Manufacturing Initiative reveals:

1. Firms that believe they are at or near world-class status in a given Next-Generation Manufacturing activity are more likely to outperform firms that rate themselves as furthest from world-class.

2. Manufacturers at or near world-class status achieve superior performance by managing in significantly different ways, including being more likely to use best practices and investing in NGM strategies.

3. Underlying both improved performances and application of best practices and investments are core differences in the awareness of NGM strategies between manufacturers at or near world-class status and those firms furthest from world-class status. Those firms at or near world-class status are far more likely to have placed more *emphasis* on NGM strategies.

The opportunity for manufacturers in the Dakotas and elsewhere to adopt Next Generation Manufacturing strategies is both urgent and compelling — as are the opportunities for local, state and national organizations and governments to support manufacturers with programs centered on Next Generation Manufacturing strategies. The data is clear: Next Generation Manufacturers will outperform their competitors in the years to come, achieving market prominence for themselves and helping to secure economic prosperity for the locales in which they operate. The only questions are: Which manufacturers — supported by resources in their regions — will get to the Next Generation first? More importantly, perhaps: What will the future look like for those manufacturers and regions that fail to adopt these strategies, and fall even farther behind?

Methodology

The Next Generation Manufacturing benchmarking initiative 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; in Dakotas, 67 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 Initiative in late 2008.

MEPs in participating states used various techniques to promote participation. Responses 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 are confidential. As incentives, respondents who provided contact information along with their specific responses 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 organizational profiles. Respondents who wished to remain anonymous while completing the questionnaire could provide contact information at a separate Web site and, as their incentive, receive a Data Report.

NGM Organizations

The NGM benchmarking initiative was coordinated by the American Small Manufacturers Coalition (an association of Manufacturing Extension Partnership centers and partners); conducted by the Manufacturing Performance Institute (MPI); and supported by Manufacturing Extension Partnership centers and partnering organizations.

The American Small Manufacturers Coalition (ASMC) is a trade association of manufacturing extension agents who work to improve the innovation and productivity of America's manufacturing community. ASMC advocates for legislative and programmatic resources that allow small manufacturing clients to better compete in the global marketplace. One ASMC program of primary focus is the National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership (MEP) program.

The MEPs that participated in the NGM Initiative, either on a state basis or as part of a region of states, are:

- Dakotas: The Dakota Manufacturing Extension Partnership Inc. (www.dakota.mep)
- Florida MEP (www.florida.mep)
- Illinois Manufacturing Extension Center (www.imec.org)
- Kentucky Manufacturing Assistance Center (www.kmac.org)
- Missouri Enterprise (www.missourienterprise.org)
- New England — Maine MEP (www.mainemep.org), Massachusetts MEP (www.massmep.org), New Hampshire MEP (www.nhmep.org), Rhode Island Manufacturing Extension Services (www.rimes.org), and Vermont Manufacturing Extension Center & Process Strategies Group (www.vmec.org)
- New Jersey Manufacturing Extension Program (www.njmep.org)
- Ohio: MAGNET (www.magnetwork.org) and TechSolve (www.techsolve.org)
- Oklahoma Manufacturing Alliance (www.okalliance.com)
- Pennsylvania Industrial Resource Centers (IRC) Network (www.pairc.net)
- South Carolina Manufacturing Extension Partnership (www.scmep.org)
- Texas Manufacturing Assistance Center (www.tmac.org)
- Wisconsin Manufacturing Extension Partnership (www.wmep.org