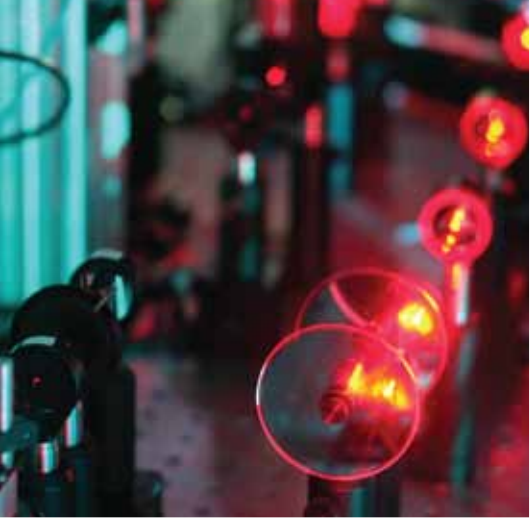

Enabling Manufacturers to Compete in the Global Economy

2010 Georgia Manufacturing Survey

HA&W
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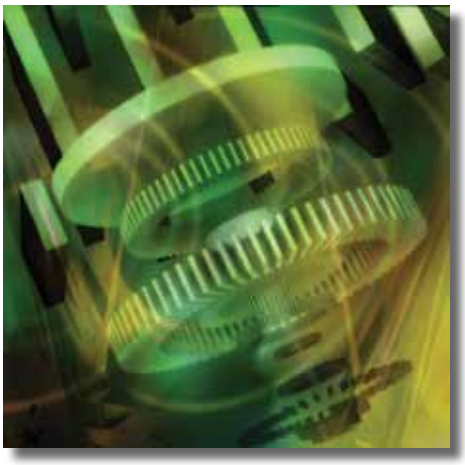
Kennesaw State University

Georgia Tech



Enabling Manufacturers to Compete in the Global Economy

The 2010 Georgia Manufacturing Survey

How Have Manufacturers Responded to Challenging Economic Times?

The theme of the 2010 Georgia Manufacturing Survey is how manufacturers have responded to the recession and its impacts. Innovation and sustainability play crucial roles in helping manufacturers achieve competitiveness and maintain it in any period, but especially so during severe economic downturns. In addition, manufacturers increasingly must operate with finite resources and greater awareness of environmental impacts.

The current survey looks at how manufacturers have responded and plan to respond to today's economic challenges. It also highlights the benefits of competing on innovation rather than on low price and indicates the extent of engagement of manufacturers in innovation. Emissions measurement for sustainable manufacturing is examined. And, as with previous studies, the 2010 Georgia Manufacturing Survey also presents the top concerns of Georgia manufacturers.

About the Survey

- Four hundred ninety-four Georgia manufacturers with 10 or more employees participated in the survey.
- The survey was undertaken from February to May 2010.
- Results were weighted by industry and employment size to represent the state's population of manufacturers.
- Industry groups were:
  - **Food/Textiles** ranges from food, animal feed and beverages to leather and apparel.
  - **Materials** encompasses industries in wood, pulp and paper, plastics, and non-metallic minerals.
  - **Machinery** also includes fabricated metals.
  - **Electronics/Transportation** covers electrical appliances.
  - **Science** comprises industries from petroleum to chemicals to medical supplies.

Summary of Findings

Strategies – Twenty percent of Georgia manufacturers chose low price to compete in the marketplace compared to less than 10 percent that competed through innovation or new technology.

Profitability – Profits of Georgia manufacturers generally declined between 2008 and 2010, but they declined much less for companies competing mainly through innovation than low price.

Outsourcing – In 2010, 16 percent of manufacturers were impacted by outsourcing, that is, work transferred from a Georgia facility, and 15 percent gained from in-sourcing, or work transferred to a Georgia facility.

Exporting – Half of Georgia manufacturers had export sales, with 22 percent of manufacturers increasing their export sales in 2009 over 2007 levels.

Research and Development – When Georgia manufacturers conducted R&D, they compared well with manufacturers across the country. However, only one-third of Georgia manufacturers conducted R&D in-house. Only 3 percent used public loans or grants to pay for R&D, and just over 10 percent used R&D tax credits.

Marketing and Sales – Nearly 40 percent of the respondents identified marketing and sales as their top concern. This figure is higher than any other past survey.

Sustainability – More than 10 percent of Georgia manufacturers have produced an emissions inventory or carbon footprint of their facility, including 40 percent of large manufacturers.

Training – Respondents (19 percent) noted technical skills as another top concern, but 25 percent reported not spending any funds on employee training, whether it involved routine tasks or new capabilities.

Response to Economic Challenges – Two-thirds of Georgia manufacturers reported fewer sales and employees in 2009 than in 2007. However, manufacturers that prioritized innovation as a strategy were nearly twice as likely as those who prioritized low cost to add sales and employees.

Strategies

Manufacturers Prioritize Strategies

As part of the Georgia Manufacturing Survey, manufacturers were asked to rank six strategies based on their importance in competing for sales. The strategies were low price, high quality, innovation/new technology, quick delivery, adapting to customer needs and sustainable manufacturing strategies.

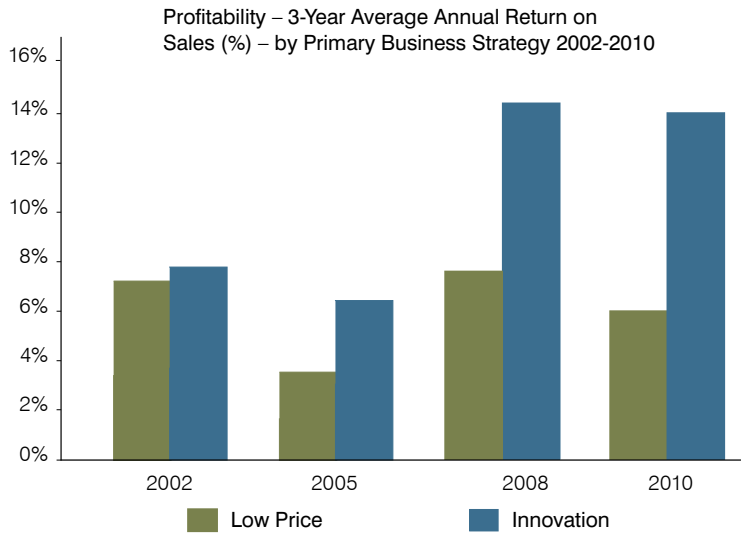
Strategy Preferences of Georgia Manufacturers

- High quality: more than 50%
- Low price: approximately 20%
- Adapting to customer needs: just over 20%
- Quick delivery: 9%
- Sustainable manufacturing: 2%
- Innovation/new technology: less than 10%

Across all six strategies, results revealed that innovation strategies were associated with the highest mean return on sales—over 14 percent. Low-price and quick-delivery strategies were linked to the lowest mean return on sales of 6 percent. High-quality strategies brought margins in the 8 percent range, while adapting to customer needs was associated with 10 percent margins.

Profits Increase for Firms Competing on Innovation

Average Return on Sales for Manufacturers Competing Primarily through Price vs. Innovation



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 surveys; Georgia Manufacturing Survey 2008, weighted responses of 738 surveys.

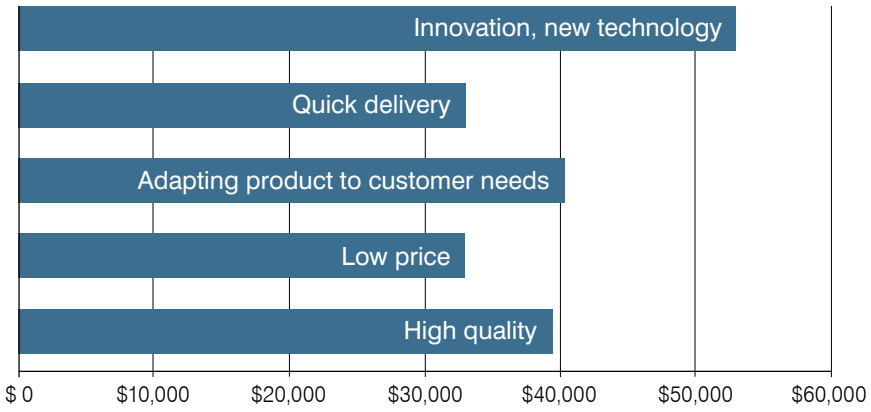
The Georgia Manufacturing Survey, begun in 1994 and conducted every two to three years, benchmarks the use of modern manufacturing technology, practices and techniques by industry statewide.

Information gleaned from the survey is used to improve manufacturing assistance programs and regional innovation initiatives that, in turn, help Georgia companies compete, improve their profitability and create jobs for Georgians.

Manufacturers that competed primarily using innovation strategies had relatively high returns on sales and higher employee wages. Most Georgia manufacturers, however, used strategies associated with low wages. Average wages for manufacturers that prioritized innovation/technology strategies were $10,000 or more higher than those for manufacturers that prioritized other strategies.

Higher Returns to the Community Linked to Innovation

Manufacturing Wages by Percentages of Respondents Ranking Strategies Highest in 2010



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

More than half of the survey respondents introduced a new or significantly improved product during the 2007-to-2009 period.

Science-based and electronics/electrical/transportation industries had a higher percentage of manufacturers primarily competing on innovation. All industries favored high quality as a primary sales strategy, especially those in the metals and machinery group. Science-based manufacturers were least likely to compete using low price as their primary strategy.

Most Manufacturers Focus on Quality and Price

Most Important Manufacturing Strategies by Industry Group (Percentage of firms indicating strategy is of highest importance)

Strategy	Food-Text	Materials	Mach	Elec-Trans	Science
High quality	57.9%	49.3%	63.1%	51.7%	52.3%
Adapting product to customer needs	21.9%	22.4%	14.2%	20.7%	20.5%
Low price	20.8%	21.1%	16.3%	20.7%	9.1%
Quick delivery	9.0%	15.1%	11.7%	13.8%	6.8%

Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

Innovation

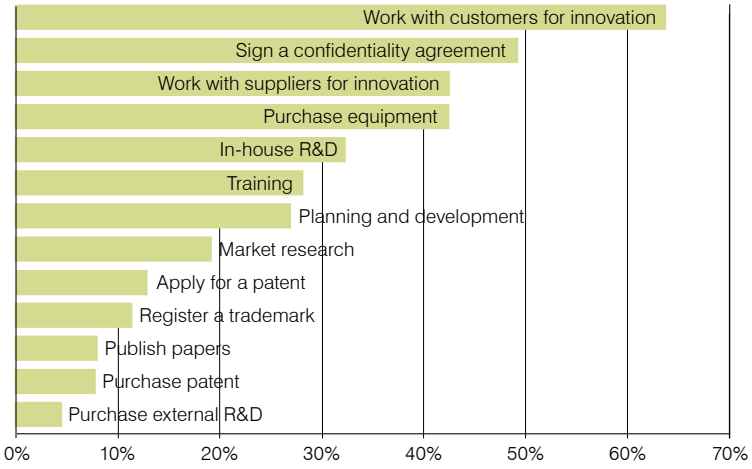
Creation and Dissemination of New Knowledge

Manufacturers were asked to indicate the extent to which their facilities undertook any of 13 innovation-related activities during the 2007-to-2009 period. The most common innovations were: (1) working with customers to create or design a product, process or other innovation; (2) signing a confidentiality agreement; (3) working with suppliers to create or design a product, process or other innovation; and (4) purchasing machinery, equipment, computers or software to implement innovations.

The least common innovation activities undertaken were: (1) purchasing external research and development; (2) purchasing or licensing patents, inventions, know-how or other types of knowledge; (3) publishing papers or technical articles; (4) registering a trademark or (5) applying for a patent.

Firms Find Diverse Ways to Innovate

Adoption of Specialized Innovation Activities
(Percentage of establishments that engaged in the activity)



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

How did Georgia manufacturers' R&D expenditures compare with those of manufacturers throughout the United States? Comparing R&D intensity – which is calculated by dividing R&D expenditures by sales (per $1,000 of sales) – from respondents to the Georgia Manufacturing Survey and from the National Science Foundation's Business R&D and Innovation Survey, we found that Georgia manufacturers as a whole were slightly below but relatively close to the U.S. benchmark. Georgia's food/beverage/textiles/apparel/leather and materials groups had higher R&D intensity levels than the U.S. benchmark. The machinery group was about on par, and the electronics/electrical/transportation and science-based industries had R&D intensity levels far below the U.S. benchmark.

R&D Intensity: Georgia vs. U.S.
(R&D intensity measured by R&D expenditures per $1,000 sales)

Industry Group	R&D Intensity 2009 Georgia*	R&D Intensity 2008 U.S. Worldwide*	R&D Intensity 2008 U.S. Domestic*
Total	**$26.0**	**$30.1**	**$31.3**
Food-Textile	$33.9	$7.7	$7.5
Materials	20.7	11.9	15.7
Machinery	19.7	18.6	22.2
Elec-Trans	23.0	47.0	52.5
Science	26.3	64.3	64.5

* Worldwide means R&D is conducted anywhere in the enterprise group, including outside the U.S. Domestic means R&D is conducted at any U.S. location in the enterprise group.

Source: Georgia Manufacturing Survey 2010, weighted responses of 324 manufacturers; U.S. National Science foundation/division of Science Resources Statistics, Business R&D and Innovation Survey: 2008.

Seventy-five percent of Georgia manufacturers experienced an increase in profitability (average annual return on sales) from 2007 to 2009. The median manufacturer's profitability was 9 percent, while the top 10 percent of manufacturers had profitability levels of 25 percent. These returns were at the same levels as 2008. However, the bottom 10 percent in 2010 had profitability returns 6 percentage points lower than 2008 levels.

Four Types of Innovation

- **Product Innovation**
  Technologically new products or significantly improved existing products.
- **Process Innovation**
  Technologically new or significantly improved practices, technologies or delivery.
- **Organizational Innovation**
  New or significant changes in structure, management methods or information exchange systems.
- **Marketing Innovation**
  New or significant changes to packaging, sales methods or distribution channels.

Some Specifics

- More than half of survey respondents introduced a new or significantly improved product during the 2007-to-2009 period.
- Fifteen percent introduced a new or significantly improved service.
- Larger manufacturers were more likely to introduce new goods.
- The gap between small and large manufacturers regarding the introduction of new services was smaller in 2010 and 2008 than 2005.
- Nearly 30 percent of respondents introduced a new-to-the-market product in the 2007-to-2009 period.

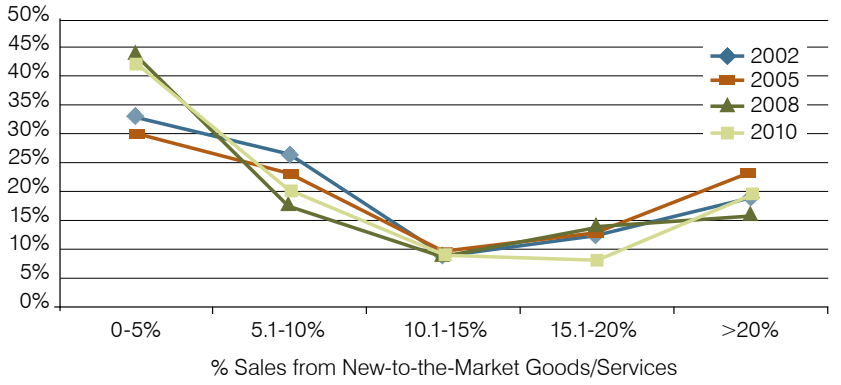
Only 11 percent of Georgia manufacturers said they took R&D tax credits even though more than 30 percent conducted R&D in-house in the 2007-to-2009 period.

The average respondent that introduced new-to-the-market goods or services reported that these goods and services accounted for nearly 16 percent of the facility's sales. However, for more than 5 percent of the respondents with new-to-the-market products or services, these offerings composed half or more of their sales.

The percentage of sales from new-to-the-market goods and services exceeded the value for 2008 but placed below the value of 2005.

Sales Reflect Modest Gains

Percentage of Sales from New-to-the-Market Goods/Services, 2002 vs. 2005 vs. 2008 vs. 2010



Source: Georgia Manufacturing Survey 2010, weighted responses of 199 manufacturers.

Innovations can be examined individually but surveyed manufacturers often implemented multiple innovations. Indeed, while 24 percent of respondents introduced no new innovations and 18 percent introduced one new innovation, nearly 60 percent introduced two or more innovations. Researchers found five clusters or groupings of innovations:

- Product-process: more than four in 10 innovating manufacturers introduced a product innovation together with a process innovation.
- All but marketing: nearly two in 10 innovating manufacturers introduced product, process, and organizational innovations together.
- Reorganization: 14 percent introduced a reorganization (organizational innovation) only.
- All innovations together, including product-process-organizational-design: 12 percent of respondents introduced almost all the innovations at the same time (albeit with less prevalent introductions of advanced management systems and sales).
- Process-organizational-design: one in 10 innovating manufacturers introduced process innovations along with organizational and design innovations.

Financial concerns remained a major constraint to innovation. However, only 3 percent of Georgia manufacturers used public loans or grants, only 3 percent received private-equity support such as venture capital, and none of the respondents used the Small Business Innovation Research (SBIR) program. These low usage rates occurred despite more than half of manufacturers having introduced a new product and one-third conducting in-house R&D—therefore they could have used these resources. One-third of respondents financed innovations with private conventional loans.

Outsourcing

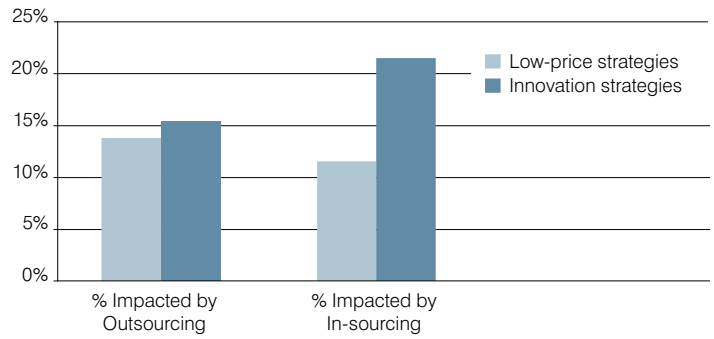
Outsourcing and In-sourcing

Between 2007 and 2009, about 16 percent of Georgia manufacturers were impacted by outsourcing, similar to what was reported in the 2008 survey. For those affected, the most common outsourcing locations were elsewhere in the United States, followed by Asia, Mexico and Central and South America. In-sourcing also occurred. Georgia manufacturers were most attractive when firms wanted to transfer work from other states.

Compared to prior surveys, 2010 manufacturers competing on innovation were as likely as manufacturers competing on low price to be affected by outsourcing. However, manufacturers that prioritized innovation as one of their top two competitive strategies were more likely to benefit from in-sourcing than were manufacturers competing via low price.

Innovation Means More In-sourcing

Percentage of Establishments Reporting Their Facility Was Impacted by Outsourcing/In-sourcing

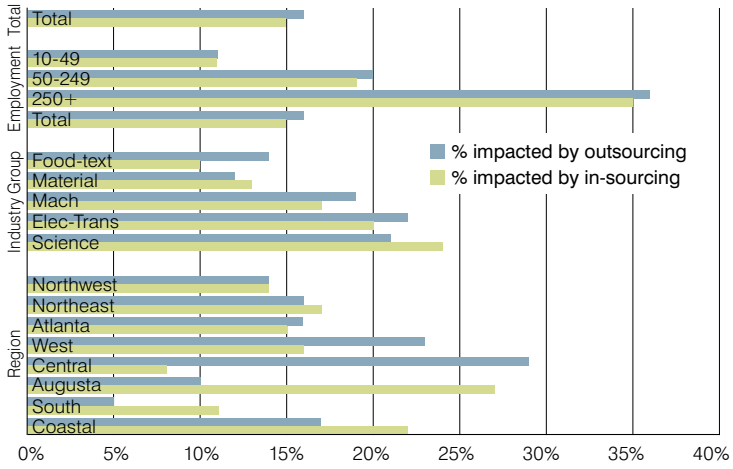


Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

The rate of in-sourcing and outsourcing was significantly higher for larger companies than for smaller companies.

Large Firms Outsource More

Percentage of Establishments Reporting Their Facility Was Impacted by Outsourcing/In-sourcing



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

Half of Georgia manufacturers reported export sales, with 22 percent of manufacturers increasing their export sales in 2009 over 2007 levels. Manufacturers in science-based industries were more likely to have export sales, followed by those in the electronics/electrical/transportation industry group. Manufacturers in the materials group were least likely to have had export sales.

Some Specifics

- Ten percent of manufacturers had work moved from Georgia to another establishment within the United States.
- Almost 6 percent saw work moved from Georgia to Asia (including China and India).
- Almost 5 percent experienced work shifted from Georgia to Mexico or other Central or South American countries.
- Less than 1 percent had work moved from Georgia to Europe or elsewhere in the world.

Concerns

Marketing and Sales Concerns Uppermost in 2010

Compared with 2008, marketing and sales proved more important to Georgia manufacturers in 2010. In addition, concerns about business and finance and computer applications rose slightly. Fewer Georgia manufacturers reported problems or needs in human resources, energy cost management, expansion planning or quality assurance than they did in the 2008 survey.

The percentage of manufacturers noting marketing problems rose from 25 percent in 2005 to 33 percent in 2008, increasing again to almost 40 percent in the 2010 survey when it became the second most prevalent need/problem. Marketing and sales concerns exceeded human-resource concerns for the first time in the history of the survey. Concerns about manufacturing process and lean manufacturing needs stayed nearly the same, approximately 32 percent in both the 2008 and 2010 surveys.

Some Specifics

- Nearly 20 percent of respondents reported problems finding technically skilled workers, and less than 14 percent reported problems finding workers with basic skills; these percentages were much lower than in 2008.
- Manufacturers with 250 or more employees were more likely to have greater concerns about finding employees with basic skills, while medium-sized manufacturers with 50-249 employees were more likely to have greater concerns about finding employees with technical skills.
- Small manufacturers were more concerned about marketing and sales, business strategy and financial analysis.

Marketing and Sales Needs Dominate

Manufacturing Problems and Needs, 2008 – 2010

	COMPARISON		DIFFERENCE
Problems/Needs	**2010**	**2008**	**2010-2008**
Marketing and sales	39.1%	32.9%	6.2%
Business, finance	13.5%	13.0%	0.5%
Computer applications	11.1%	10.7%	0.4%
Product development, design	15.4%	15.5%	-0.1%
Manufacturing process/lean	31.6%	32.3%	-0.7%
Environmental, health and safety	12.3%	13.3%	-1.0%
Expansion planning, facility layout	13.5%	17.6%	-4.1%
Energy cost management	18.9%	23.2%	-4.3%
Quality assurance	11.5%	17.1%	-5.6%
Human resources problems	35.9%	42.6%	-6.7%
Management and leadership	12.8%	12.6%	0.2%
Technical skills	18.8%	23.8%	-5.0%
Basic skills	13.9%	21.9%	-8.0%

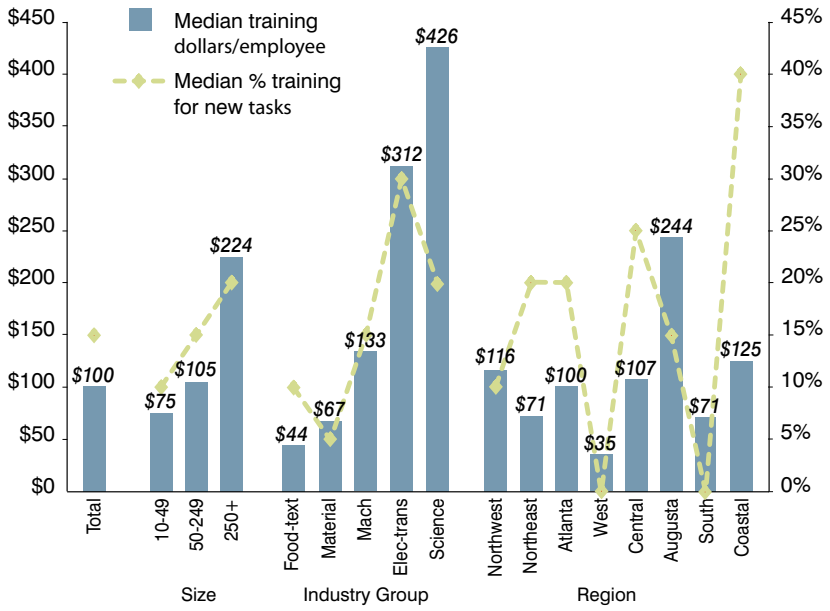
Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers; Georgia Manufacturing Survey 2008, weighted responses of 738 manufacturers.

Training

Workforce Skills Remain an Issue

Among manufacturers that spent money on training in 2009, the median respondent reported that 20 percent of training dollars were spent on non-routine training. Twenty-five percent of respondents spent more than 50 percent of their training dollars on new activities and tasks. Small manufacturers not only spent less, but most of their spending (90 percent) was for routine training.

Median Expenditures Per Employee on All Training Activities in 2009 and Median Percentages of Training Dollars Related to New Activities and Tasks



Source: Georgia Manufacturing Survey 2010, weighted responses of 300 manufacturers.

In 2010, expenditures for training were low, with 25 percent of respondents spending no money at all to train employees.

Some Specifics

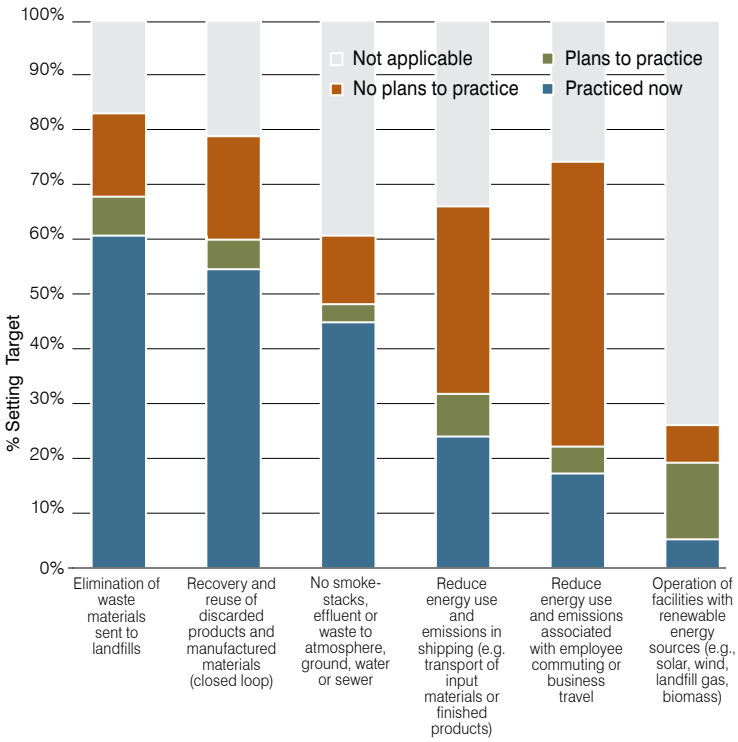
- Respondents in the coastal region spent the most on training on a per-employee basis, and those in west Georgia spent the least.
- The median manufacturing establishment had only 12 percent of employees with two or more years of technical or vocational college and only 11 percent with bachelor's degrees in at least half of their workforce. One-third of manufacturers had at least one employee with a master's or doctorate in science, engineering or information technology; advanced degrees are an indicator of innovation capability.

Sustainability

Sustainable manufacturing involves minimizing use of natural resources, toxic materials, waste emissions and production materials over the life cycle of the product or part to achieve cost savings and environmental and social benefits.

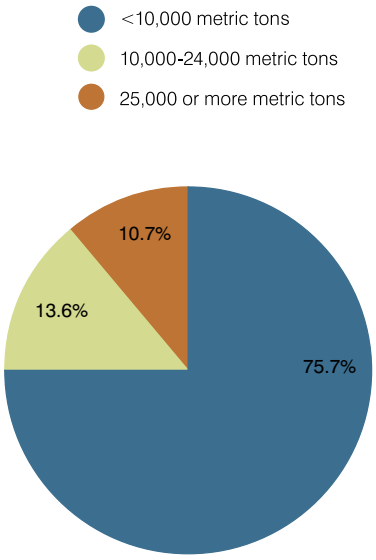
In the 2010 survey, Georgia manufacturers showed wide use of sustainability practices, with more than 75 percent having set goals to improve the sustainability of their processes. Sustainability goals to eliminate waste sent to landfills were most prevalent. Less common were goals to reduce energy use and emissions in shipping, in employee commuting or in business travel. The most common planned goal was operation of facilities with renewable energy sources.

Manufacturing Goals for Sustainability



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

Percentage of Respondents That Have Conducted a Carbon Footprint Estimate or Emissions Inventory by Annual Emission Level



Source: Georgia Manufacturing Survey 2010, weighted responses of 43 manufacturers.

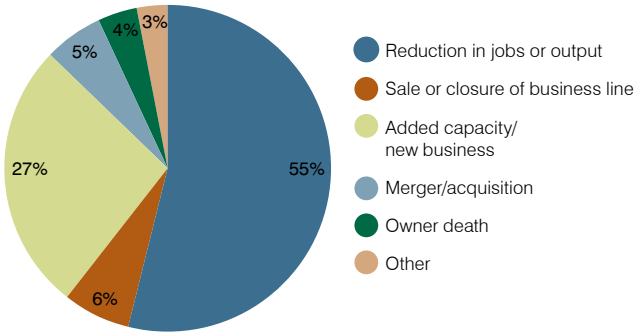
Large manufacturers were more likely to have set sustainable manufacturing goals, especially for operation of facilities with renewable energy sources. Science-based manufacturers were the most likely to have adopted sustainable manufacturing goals relating to elimination of waste and elimination of smokestacks/effluent/waste. The electronics/electrical/transportation industry was the most likely to recover/reuse products, reduce energy use in shipping and reduce energy use in employee travel. The lowest levels of goal adoption were in the metals/machinery and food/textiles/apparel/leather groups.

Eleven percent of Georgia manufacturers have conducted emissions inventories of their carbon footprint. However, 40 percent of large manufacturers have conducted these inventories. In comparison, nearly 20 percent of medium-sized manufacturing respondents but fewer than 5 percent of small manufacturing respondents have produced a carbon footprint or emissions inventory. Science-based industries were most likely to have produced a carbon footprint or emissions inventory, followed by electronics/electrical/transportation industries. Metals and machinery industries were least likely to have produced a carbon footprint or emissions inventory.

How Manufacturers Are Responding to Challenging Times

Six percent of manufacturers have had to close or sell part of their business and more than half have had to reduce labor or production in the past two years. On the other hand, more than one-fourth of the manufacturers have added capacity or benefitted from work from other manufacturing facilities consolidating into the Georgia facility.

Significant Changes in the Past Two Years



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

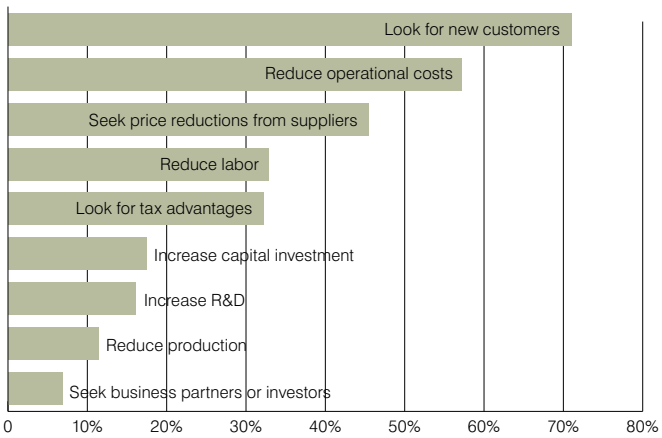
Manufacturers with fewer than 250 employees were more likely to have had to close or sell part of their business. Small (10-49 employees) and large (250 or more employees) were most likely to have added capacity or benefitted from work from other facilities.

Manufacturers that compete based on innovation were 1.6 times more likely than manufacturers competing based on low price to have added capacity or new business in the last two years.

In addition, two-thirds of Georgia manufacturers reported fewer sales and employees in 2009 than in 2007. Smaller firms were more likely to have lost sales and jobs than were their larger counterparts. However, manufacturers that prioritized innovation as a strategy were 1.8 times more likely than those that prioritized low cost to have added sales and 1.9 times more likely to have added employees.

In the coming year, seven of 10 Georgia manufacturers plan to look for new customers while nearly 60 percent plan to reduce operational costs.

Expected Response to the Economy in the Coming Year



Source: Georgia Manufacturing Survey 2010, weighted responses of 494 manufacturers.

Speeding up the collection process and existing cash flow were the most common changes to financing methods during the credit crisis. New loans were least common.

2010 Georgia Manufacturing Survey – Research Leaders and Sponsors

Jan Youtie

Dr. Jan Youtie is the director of the 2010 Georgia Manufacturing Survey. Youtie is a principal research associate in Georgia Tech's Enterprise Innovation Institute and an adjunct associate professor in Georgia Tech's School of Public Policy. She specializes in applied research in economic development and industrial modernization.

"The last two years have been a challenging business environment. However, some manufacturers have found opportunities to expand their business through innovation." Jan Youtie

Philip Shapira

Professor Philip Shapira is the co-director of the 2010 Georgia Manufacturing Survey. Shapira is a professor at Georgia Tech's School of Public Policy and also a professor of innovation management and policy with the Manchester Institute for Innovation Research at the United Kingdom's Manchester Business School.

"Innovation remains as important as ever. Those Georgia companies that innovate receive positive returns for doing so. But a significant number of companies still have not adopted innovation as a leading strategy." Philip Shapira

Dimitri Dodonova

Dimitri Dodonova led survey research and analysis at Kennesaw State University (KSU). He is assistant director of KSU's Econometrics Center.

Donald Sabbarese

Professor Donald Sabbarese, director of the Econometrics Center, is a co-leader at KSU, conducting analyses for the Georgia Manufacturing Survey.

Additional research assistance was provided by Luciano Kay at Georgia Tech and Carmen Morales at Kennesaw State University.

Richard Kopelman

Habif, Arogeti & Wynne, LLP is one of the top 50 U.S. accounting and consulting firms and an underwriter of this year's survey. In addition to delivering traditional audit and tax services, the firm's manufacturing and distribution practice is committed to helping clients gain greater control over production and operations, reduce waste and lower inventories, and develop a synchronized supply chain, which all improve profitability and competitive edge. Richard Kopelman is a partner with HA&W and heads the manufacturing and distribution practice.

A special thanks to this year's sponsors: Georgia Tech Enterprise Innovation Institute; School of Public Policy, Ivan Allen College, Georgia Tech; Georgia Department of Labor; Kennesaw State University; and Habif, Arogeti & Wynne, LLP.

For more survey information, contact Jan Youtie at 404.894.6111 (jan.youtie@innovate.gatech.edu), or Richard Kopelman at 404.898.8236 (richard.kopelman@hawcpa.com).

Visit www.cherry.gatech.edu/survey to download a PDF of the full report.