

2014

The Georgia Manufacturing Survey

Making it in the
Global Economy



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About the Survey

504 Georgia manufacturers with 10 or more employees participated in the survey.

The survey was undertaken from February to June 2014.

Results were weighted by industry and employment size to represent the population of manufacturers.

Industry groups were as follows:

- Food/Textiles includes food and beverage production, animal feed, apparel and leather.
- Material encompasses industries in wood, pulp and paper, plastics and non-metallic minerals.
- Machinery also includes fabricated metals.
- Electronics/Transportation includes electrical appliances and vehicles.
- Science includes petro-chemicals, pharmaceuticals and medical supplies.

Innovation, advanced technology, and balancing competition and collaboration play crucial roles in helping manufacturers thrive today and prepare for the future. Manufacturers increasingly must not only use efficient and productive technologies but also continuously adapt and innovate in the context of finite resources and greater awareness of environmental impacts.

The 2014 Georgia Manufacturing Survey looks at how Georgia manufacturers deploy information, quality management, and production technologies. It also examines the benefits of competing on innovation rather than on low price and indicates the extent of engagement of manufacturers in innovation. The use of outsourcing and in-sourcing is depicted and workforce and training practices are presented. The 2014 Survey also highlights the top concerns of Georgia manufacturers.

Key Findings

STRATEGIES – 14% of Georgia manufacturers chose low price to compete in the marketplace compared to 6% that compete through innovation or new technology.

PROFITABILITY – Profits of Georgia manufacturers generally increased between 2012 and 2014, by 13% on average.

OUTSOURCING – In 2014, 11% of manufacturers were affected by outsourcing, that is, work transferred from a Georgia facility, and 13% gained from in-sourcing, or work transferred to a Georgia facility. These percentages are below those reported in the 2012 survey.

EXPORTING – Nearly half of Georgia manufacturers had export sales, with 20% of manufacturers increasing their export sales in 2013 over 2011 levels. These percentages are below those reported in the 2012 survey.

RESEARCH AND DEVELOPMENT – Georgia manufacturers who conducted R&D compare well with manufacturers across the country. However, only 27% of Georgia manufacturers conducted R&D in-house. Only 2% used public loans or grants to pay for R&D and only 16% used R&D tax credits.

MANUFACTURING CONCERNS – 32% of the respondents identified marketing and sales as their top concern. Concerns about the lack of basic and technical workforce skills show the most growth over 2012 levels.

SUSTAINABILITY – Only 9% of Georgia manufacturers have produced a carbon footprint inventory of their facility. While nearly half of large manufacturers produced an emissions inventory, just 2% of small manufacturers have tracked carbon emissions.

TRAINING – More than a quarter (28%) of respondents said technical skills were a top concern. Yet, 29% reported not spending any funds on employee training, whether it involved routine tasks or new capabilities.

INVESTING IN TECHNOLOGY – More than half of manufacturers reported using enterprise resource planning, computer aided design, and preventive/predictive maintenance. Plans for investing in new technologies were most common for bar code readers (15%). Plans to invest in new technologies were below 2012 levels.

Overall, as the economy has improved, Georgia manufacturers are reaping current benefits in higher profitability levels but they are not yet expanding innovation, training, and manufacturing technologies.

Manufacturing Strategies

As part of the 2014 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

- Quality: 57%
- Low price: 14%
- Adapting to customer needs: 20%
- Quick delivery: 14%
- Sustainable manufacturing: 2%
- Innovation/new technology: 6%

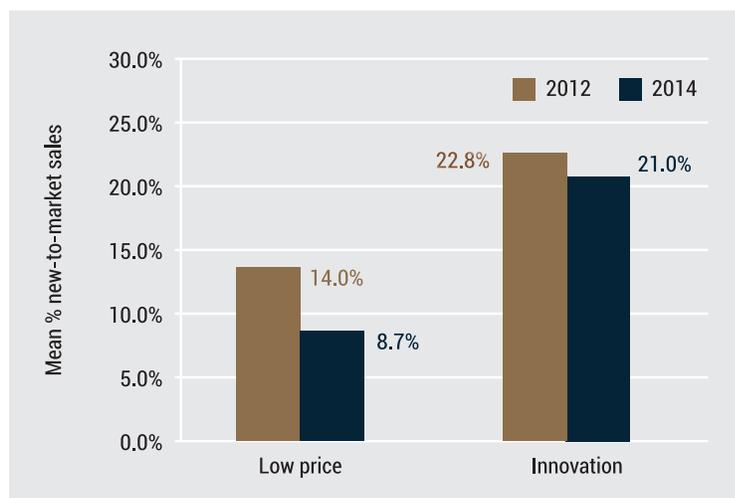
Across all six strategies, results revealed that innovation strategies were associated with the highest mean return on sales—over 10%. However, manufacturers prioritizing low price nearly doubled their profitability to slightly more than 9%, aided possibly by the current increase in economic demand. Quick delivery strategies were linked to the lowest mean return on sales of 7%. High quality strategies brought margins over 9% as did customization. While average profitability was not that much different across the strategies, the smallest firms were most active in innovation (7% for firms with less than 50 employees versus 3% for firms with 250 or more employees), but medium size firms (with average profitability of 15%) and privately-held firms (with average profitability of 12%) had the leverage to increase returns. Large Georgia plants were relatively more focused on low price.

New-to-the-market sales, an indicator of future competitiveness, were higher for firms prioritizing innovation strategies than those prioritizing low price. Moreover, new-to-the-market sales were much lower for low price competitors in 2014 than for 2012 while staying nearly the same for innovation competitors.

New-to-the-market Sales

Higher for manufacturers competing primarily through innovation than through low price

(Percentage of sales that were new-to-the-market by primary business strategy: 2012-2014)



Source: Georgia Manufacturing Survey 2014, weighted responses of 191 surveys; Georgia Manufacturing Survey 2012, weighted responses of 215 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.



Nearly half (48%) of the survey respondents introduced a new or significantly improved product or service during the 2011-to-2013 period.

Manufacturers that compete primarily using innovation strategies had relatively high higher employee wages. Many Georgia manufacturers, however, used strategies associated with lower wages. Average wages for manufacturers that prioritize innovation/technology strategies were \$5,000 higher than those for manufacturers that prioritize low price and quick delivery strategies.

Higher Returns to the Community are Linked to Innovation and Customization
Average manufacturing wages by strategies of Georgia manufacturers



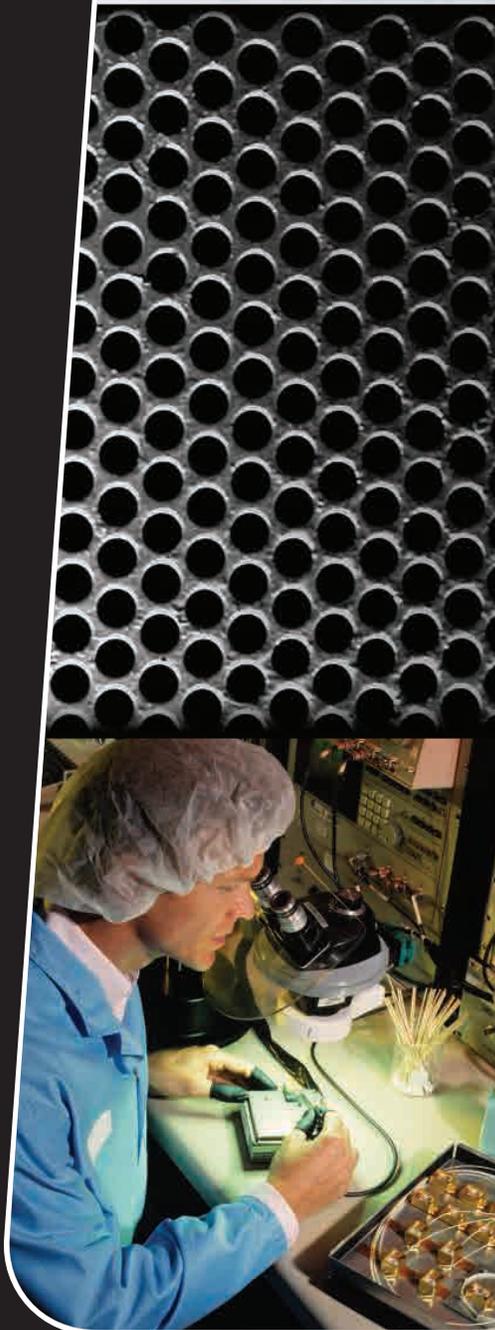
Source: Georgia Manufacturing Survey 2014, weighted responses of 310 manufacturers.

Electronics and 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 food and textiles 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	By Industry Group				
	Food-Textiles	Material	Machinery	Electronics Transportation	Science
High quality	63.6%	57.5%	59.1%	53.9%	45.7%
Adapting product to customer needs	12.4%	19.8%	20.0%	20.5%	30.4%
Low price	17.1%	12.5%	14.1%	12.8%	10.9%
Quick delivery	8.7%	15.6%	13.8%	20.5%	6.5%
Innovation, new technology	5.9%	3.4%	6.4%	15.4%	8.7%

Source: Georgia Manufacturing Survey 2014 weighted responses of 504 manufacturers.



Creation and Dissemination of New Knowledge

When manufacturers were asked to indicate the extent to which their facilities undertook any of 13 innovation-related activities during the 20011-to-2013 period, the most common innovations were: (1) purchasing machinery, equipment, computers or software to implement innovations; and (2) signing a confidentiality agreement.

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) applying for a patent; and (5) registering a trademark.

Firms Find Diverse Ways to Innovate

Adoption of specialized innovation activities

(Percentage of establishments that engaged in the activity)

Purchase equipment	43.7%
Sign a confidentiality agreement	40.0%
In-house R&D	27.2%
Planning and development	26.4%
Training	23.5%
Market research	15.8%
Cooperate with suppliers for innovation	15.0%
Cooperate with customers for innovation	12.2%
Register a trademark	9.2%
Apply for a patent	9.0%
Publish papers	6.5%
Purchase patent	3.7%
Purchase R&D	3.5%

Source: Georgia Manufacturing Survey 2014, weighted responses of 504 manufacturers.

How do Georgia manufacturers' R&D expenditures compare with that of manufacturers throughout the United States? Comparing R&D intensity – which is calculated by dividing R&D expenditures by sales and shown as a percentage – from respondents to the Georgia Manufacturing Survey and from the National Science Foundation's Business R&D and Innovation Survey, we see that Georgia manufacturers as a whole were lower than the U.S. benchmark, although with variations by major industry group. Georgia's food, textiles, materials, machinery, and science-based groups had higher R&D intensity levels than the U.S. benchmark, while the electronics/electrical/transportation group had R&D intensity levels below the U.S. benchmark.

R&D Intensity: Georgia versus U.S.

(R&D intensity measured by R&D expenditures as a percentage of sales)

	R&D Intensity 2013 Georgia	R&D Intensity 2011 U.S. (domestic*)
Total	3.66%	3.92%
Industry Group		
Food-text	1.45%	0.82%
Material	2.49%	1.49%
Mach	4.68%	3.39%
Elec-Trans	5.81%	7.74%
Science	7.58%	4.51%

*Domestic means R&D is conducted at any U.S. location in the enterprise group.

Sources: Georgia Manufacturing Survey 2014, weighted responses of 287 manufacturers; U.S. National Science Foundation/Division of Science Resources Statistics, Business R&D and Innovation Survey: 2011.

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 manufacturer's structure, management methods or information exchange systems.

Marketing Innovation

New or significant changes to packaging, design, sales methods or distribution channels.

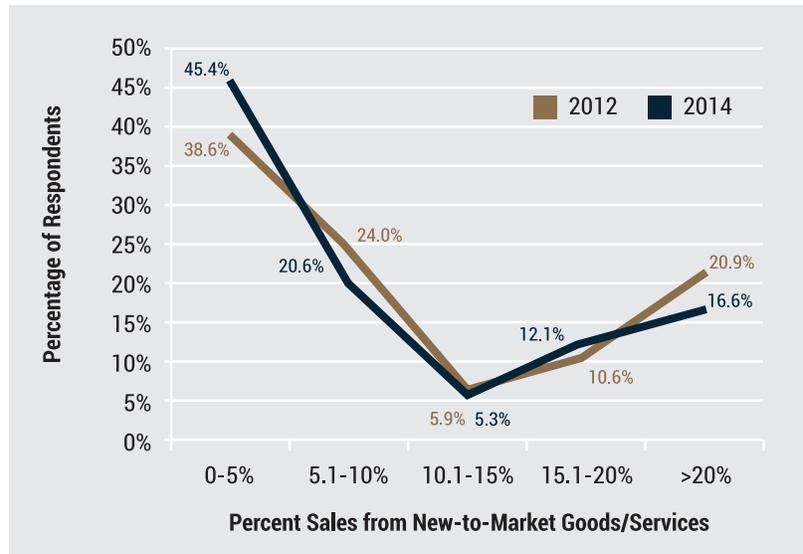
Eighty-four percent of Georgia manufacturers experienced positive profitability (average annual return on sales) from 2011 to 2013. The median manufacturer's profitability was 9%, while the top 10% of manufacturers had profitability levels of 25% or more and the bottom 10% had -3%. These returns were similar to the 2012 survey, except that there were more manufacturers with 9% or more profitability and fewer with negative profitability.

Manufacturers that introduced new-to-the market goods or services reported that these goods and services typically accounted for more than 13% of the facility's sales. Fifty-five percent of companies with new-to-the market goods or services received at least 5% of their sales from these new goods or services.

The percentage of sales from new-to-the-market goods and services in 2014 is above the value for 2012.

Modest Declines in New-to-market Sales

(Percentage of sales from new-to-market goods/services: 2012 vs. 2014)



Source: Georgia Manufacturing Survey 2014, weighted responses of 191 manufacturers; Georgia Manufacturing Survey 2012, weighted responses of 215 manufacturers.

Financial concerns are a major limitation on innovation. However, only 2% of Georgia manufacturers use public loans or grants, only 2% received private equity support such as venture capital, and fewer than 1% of the respondents used the Small Business Innovation Research (SBIR) program. These low usage rates exist despite nearly half of manufacturers having introduced a new product and 27% of manufacturers conducting in-house R&D, and therefore could have made use of these resources. Less than 30% of respondents financed innovations with private conventional loans.

Large manufacturers with 250 or more employees were somewhat more likely than small manufacturers to have received public support for innovation. The use of personal or family funds for innovation was more prevalent among smaller facilities.

Some Specifics

Nearly half of survey respondents introduced a new or significantly improved product during the 2011-to-2013 period.

14% introduced a new or significantly improved service.

Larger manufacturers were more likely to introduce new goods.

25% of respondents introduced a new-to-the-market product or service in the 2011-to-2013 period.

Only 16% of manufacturers said they used R&D tax credits even though 27% conducted R&D in-house.



Open and Collaborative Innovation

Open and collaborative innovation has the potential to offer new sources of ideas for manufacturers beyond what is available internally. Twenty-four percent of respondents indicated they cooperated on innovation activities with other firms or institutions. Cooperation was more common for larger manufacturers with more than 250 employees (67%) than small manufacturers with 10-49 employees (18%) and for manufacturers in the electrical/electronics/transportation industry group (42%).

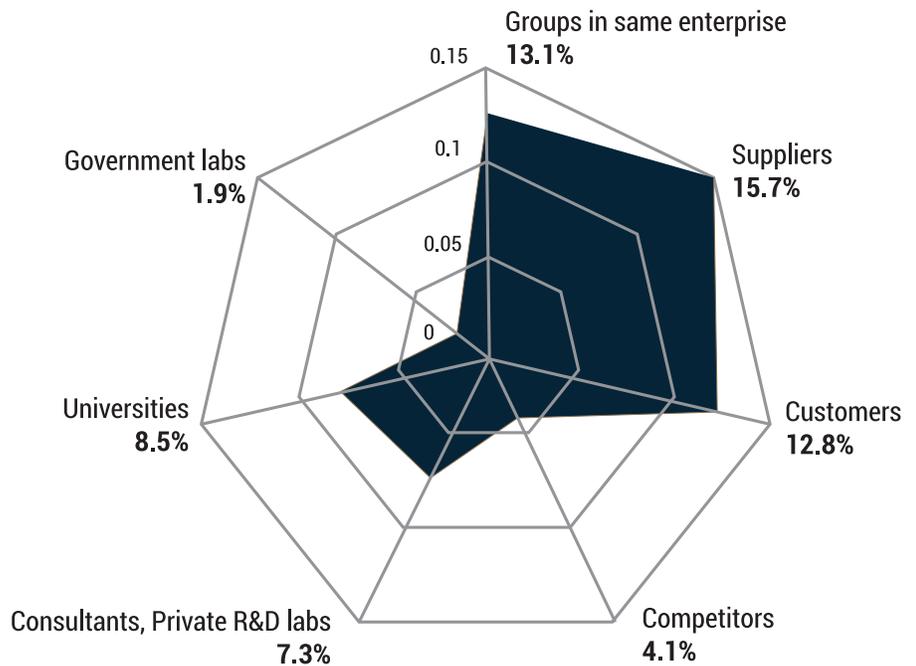
Cooperation on innovative activities was most prevalent with suppliers (16%), groups in the same enterprise (13%) and customers (13%). It was least common with government laboratories (2%) and competitors (4%).

Manufacturers were more than twice as likely to cooperate with partners in the US as with international partners (19% versus 9% respectively). Those engaged in cooperation plan to maintain or increase their cooperation into the future; only 2% planned to decrease cooperation. Manufacturers cooperating with partners on innovation activities are more likely to have export sales (68%) than those that do not cooperate (40%).

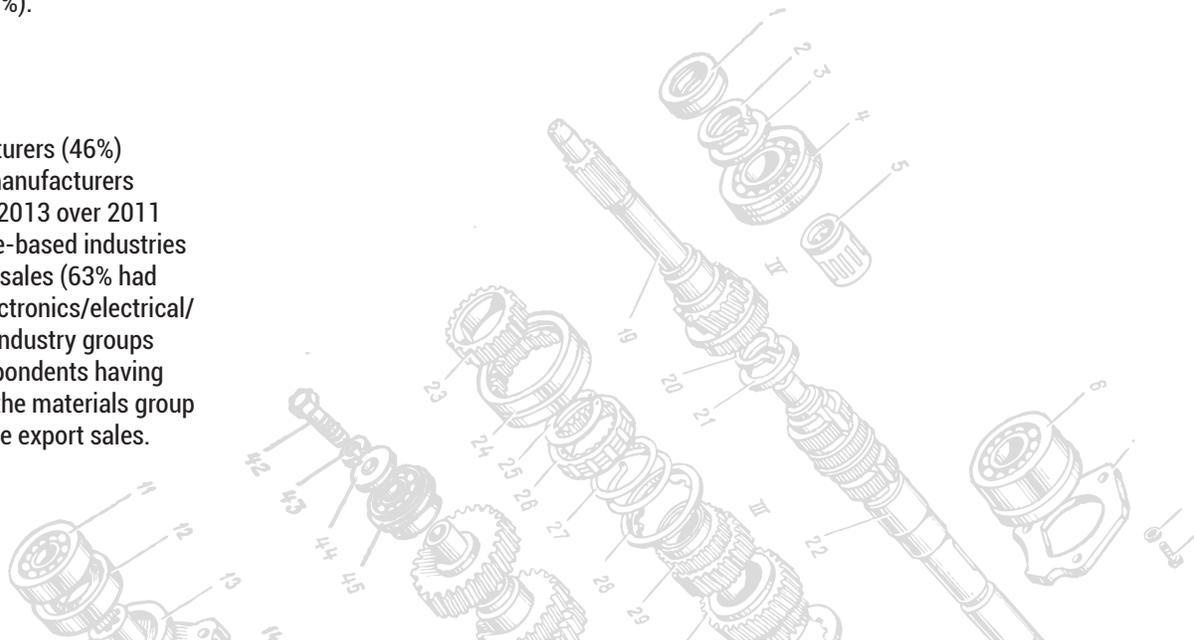
Exports

Nearly half of Georgia manufacturers (46%) had export sales, with 20% of manufacturers increasing their export sales in 2013 over 2011 levels. Manufacturers in science-based industries were more likely to have export sales (63% had export sales). Food/textiles, electronics/electrical/transportation, and machinery industry groups followed with about 50% of respondents having export sales. Manufacturers in the materials group (at 35%) were least likely to have export sales.

Cooperation on Innovation Activities by Type of Partner
(Percent cooperating)



Source: Georgia Manufacturing Survey 2014, weighted responses of 447 manufacturers.

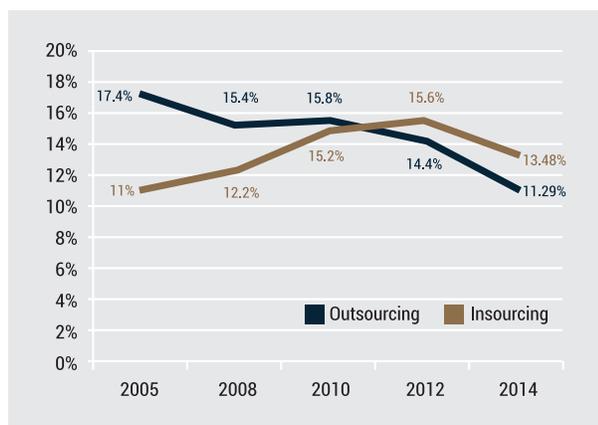


Outsourcing and In-sourcing

Between 2011 and 2013, only 11% of Georgia manufacturers were affected by outsourcing, somewhat less than the 14% reported in the 2012 survey. For those affected, the most common outsourcing locations were elsewhere in the United States, followed by Asia and Mexico and Central and South America. In-sourcing also occurred. The in-sourcing rate of transfer of work to Georgia manufacturers was more than 13%, slightly higher than the percentage of firms affected by outsourcing, but below 2012 survey levels. There was a slight increase in respondent percentages reporting work transferred from Mexico to Georgia manufacturers (from 1.3% in 2012 to 1.8% in 2014) and from Europe to Georgia (from 0.4% in 2012 to 1.2% in 2014), while reports of work from Asia to Georgia somewhat declined (from 4.3% in 2012 to 3.4% in 2014). In-sourcing and outsourcing are not mutually exclusive; nearly 24% of manufacturers affected by in-sourcing and outsourcing were involved in both.

In-sourcing Exceeds Outsourcing Rates

(Percentage of establishments reporting work transferred from facility (outsourcing) or to facility (in-sourcing))

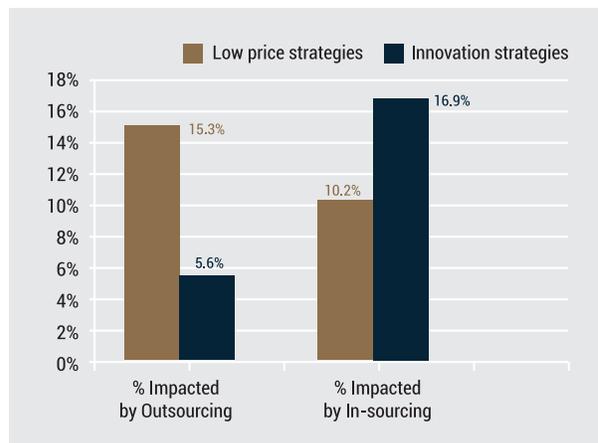


Source: Georgia Manufacturing Survey's: 504 weighted responses (2014); 528 weighted responses (2012); 494 weighted responses (2010); 676 weighted responses (2008); 617 weighted responses (2005)

Manufacturers that prioritized competing on innovation were less likely to be affected by outsourcing than those prioritizing low price strategies. They were also more likely to benefit from in-sourcing than manufacturers competing based on low price.

Innovation Means More In-sourcing

(Percentage of establishments reporting their facility was affected by outsourcing/in-sourcing)

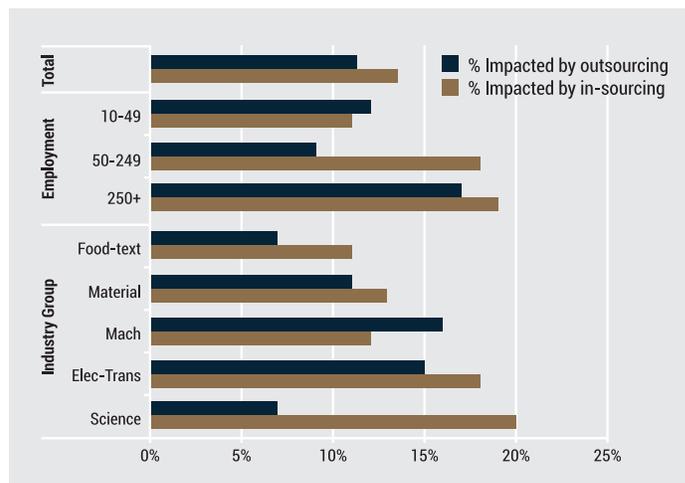


Source: Georgia Manufacturing Survey 2014, weighted responses of 504 manufacturers.

The rate of outsourcing was somewhat higher for large companies than for smaller companies. The rate of in-sourcing was significantly higher for medium-sized and large companies and for science-based establishments.

Large Firms Outsource More

(Percentage of establishments reporting their facility was impacted by outsourcing/in-sourcing)



Source: Georgia Manufacturing Survey 2014, weighted responses of 504 manufacturers.

8% of manufacturers had work moved from Georgia to another establishment within the United States

3% had work moved from Georgia to Asia (including China and India)

2% had work moved from Georgia to Mexico or other Central or South American country.

Less than 1% had work moved from Georgia to Europe or elsewhere in the world.

Basic and Technical Skill Needs Rise in 2014

Marketing and sales remained the most common problems or needs among Georgia manufacturers in 2014, although down slightly in prevalence since 2012. Lean manufacturing challenges were the second most common need or problem, although also less prevalent than in 2012.

Technical and basic skills have become more important in the last two years. Twenty-eight percent of respondents indicated problems finding employees with technical skills and 22% with basic skills. These percentages are 4% and 5% higher respectively than 2012 levels.

Expansion planning needs also are on the rise, with 16% of respondents indicating this area to be a need. This figure is slightly higher (nearly 3% higher) than 2012 levels.

These responses likely reflect the influence of the increased demand for manufactured products in the current economic cycle, making sales of existing products a bit easier and increasing the skills needs and plans for expansion.

Energy cost management diminished as a problem since the 2012 survey. Only 11% of respondents report energy cost management to be a problem compared to 21% in 2012. This decline reflects a reduction in energy costs, which dropped as a percentage of sales by nearly 6% for the median manufacturer; the decline was even greater for the median large manufacturer with 250 or more employees (12%) and for the median manufacturer in the materials industry group (8%).

Quality management issues also declined, with only 10% of respondents reporting a concern with quality systems.

Manufacturing Problems and Needs: 2012-2014

Problems/Needs	COMPARISON		DIFFERENCE
	2014	2012	2014-2012
Marketing and sales	32.3%	36.0%	-3.7%
Lean manufacturing, workflow improvement	27.9%	31.6%	-3.7%
Technical skills	27.5%	23.5%	4.0%
Basic workforce skills	21.8%	16.4%	5.4%
Expansion planning, facility layout	16.3%	13.8%	2.5%
Management and leadership skills	12.9%	12.2%	0.7%
Product development, design	12.2%	11.4%	0.8%
Environmental, safety compliance, health, workplace	12.1%	13.5%	-1.4%
Energy cost management	11.4%	21.4%	-10.0%
Information systems & hardware	11.2%	12.2%	-1.0%
Business, finance	11.1%	11.4%	-0.3%
Quality management systems	10.4%	13.6%	-3.2%

Source: Georgia Manufacturing Survey 2014, weighted responses of 504 manufacturers; Georgia Manufacturing Survey 2012, weighted responses of 528 manufacturers.

Manufacturers with 50 or more employees were more likely to have greater concern about finding employees with basic or technical skills.

Small manufacturers with 10-49 employees were more concerned about marketing and sales (41%) than were their larger firm (with 250 or more employees) counterparts (22%).

The electronics/transportation industry group had the highest share of concerns across the broadest array of need areas, including lean manufacturing (39%), technical skills (39%), basic workforce skills (33%), product development (21%), and information systems and hardware (21%).



Expenditures for training were low, with 29% of respondents spending no money at all to train employees.

Some Specifics

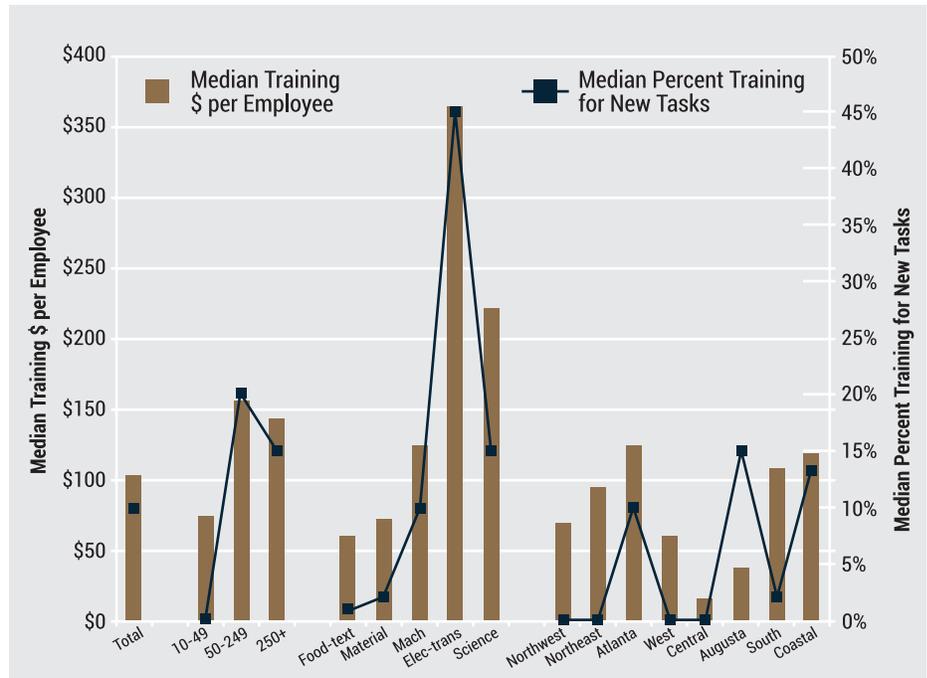
Respondents in the Atlanta region spent the most on training on a per-employee basis, and those in the west and central regions of Georgia spent the least.

The median manufacturing establishment had only 12% of employees with two or more years of technical or vocational college. Twelve percent also had bachelor's degrees in at least half of their workforce. More than 30% of manufacturers have at least one employee with a master's or doctorate in science, engineering, or information technology; this is an indicator of innovation capability.

Workforce Skills Remain Unsupported

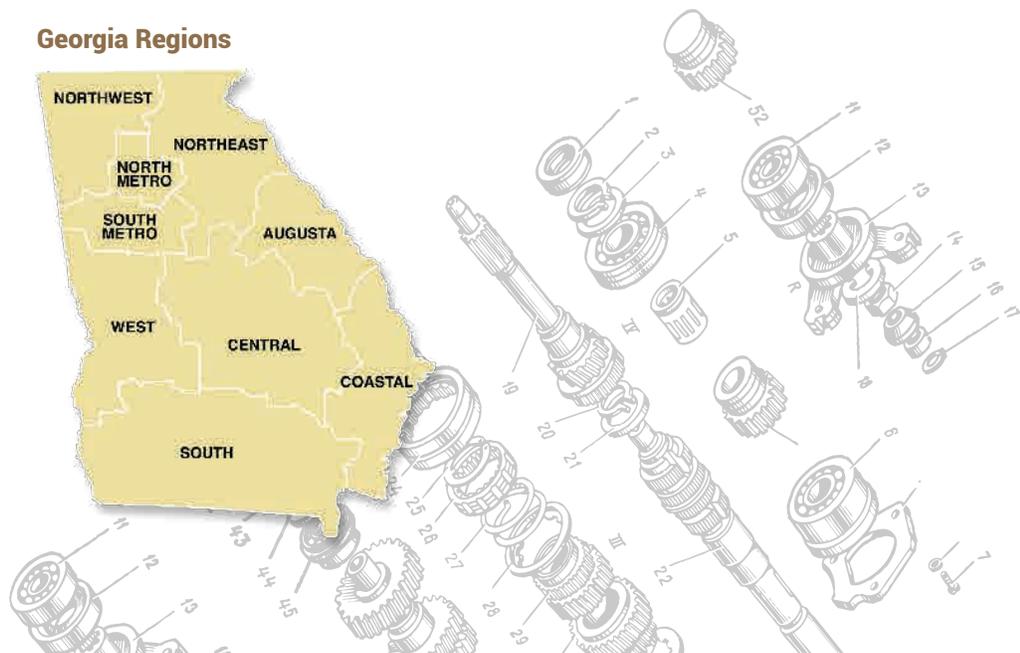
Twenty-nine percent of manufacturers spent no money on training in 2013. Among manufacturers that spent money on training in 2013, the median respondent reported that only 10% of training dollars were spent on training related to new activities and tasks (i.e., not routine training). Some 20% of respondents spent more than 50% of their training dollars on new activities and tasks. Small manufacturers not only spent less, but virtually all of their spending was for routine training.

Median Expenditures Per Employee on All Training Activities in 2013 and Median Percentage of Training Dollars Related to New Activities and Tasks



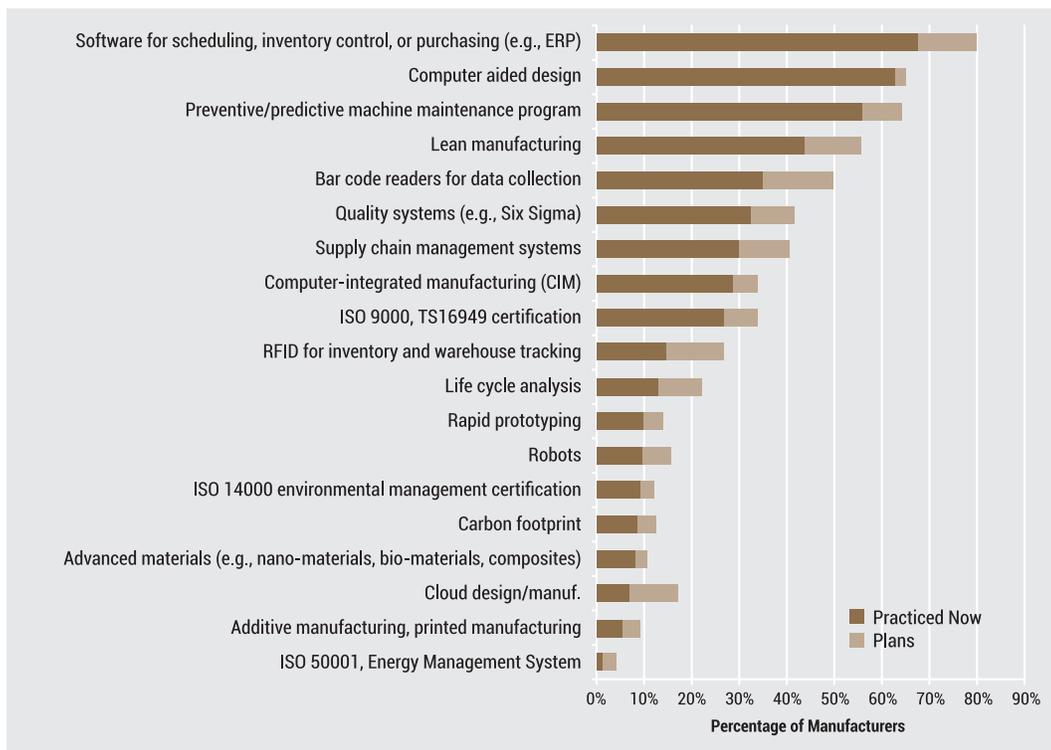
Source: Georgia Manufacturing Survey 2014, weighted responses of 294 manufacturers.

Georgia Regions



Manufacturers used a range of information technologies, quality management and sustainable manufacturing practices, and manufacturing production technologies in 2014, but use is less than in 2012. Software for scheduling, inventory control of purchasing such as enterprise resource planning (ERP), was the most commonly used in the 2014 survey (68%), followed by computer aided design (CAD) (63%), preventive and predictive maintenance (56%), and lean manufacturing (44%). Plans for acquiring new technologies were most common for bar code readers (15%) and (at 12% each) radio frequency identification (RFID) for inventory and warehouse tracking, ERP, and lean manufacturing. These percentages are below 2012 survey levels, when ERP was used by 71%, CAD (65%), preventive and predictive maintenance (60%) and lean manufacturing (50%) and plans for adopting bar code readers were 21% and RFID 18%.

Technologies and Techniques Manufacturers Use and Plan to Use



Source: Georgia Manufacturing Survey 2014, weighted responses of 390 manufacturers.

The use of technologies and techniques increases with facility employment size. However, the use of rapid prototyping is not strongly related to employment size. By industry, the electronics/electrical/transportation group had the highest use of these technologies and techniques. RFID was most prevalent in the food/textile/apparel/leather group (used by 25% of these respondents) and CAD in the machinery and electronics/electrical/transportation groups (used by 76% of respondents in these groups).

Sustainable manufacturing practices are in use by a small set of manufacturers. Only 9% of manufacturers have conducted emission inventories of their carbon footprint. However, nearly half of large manufacturers (48%) have conducted these inventories, while only 13% of medium-sized and 2% of small manufacturers have produced an inventory. Use of ISO 14000 and ISO 50001 was also more prevalent among manufacturers with 250 or more employees (32% and 12% respectively) than among those with 10-49 employees (3% and 0% respectively).

If basic and advanced technologies are distinguished, 90% of respondents used at least one basic technology (such as machine maintenance, computer aided design, or ISO 9000), while 70% used at least one advanced technology (such as RFID, additive manufacturing, or new materials).





“Since the 2012 survey, Georgia manufacturers have gained from the decline of outsourcing, which has contributed to greater profitability levels for the industry.”

JAN YOUTIE



DR. JAN YOUTIE is the director of the 2014 Georgia Manufacturing Survey. Youtie is a director of policy research services in Georgia Tech's Enterprise Innovation Institute and an adjunct with Tech's School of Public Policy. She specializes in technology-based economic development, emerging technology assessment, and advanced manufacturing.



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DIMITRI DODONOVA at Kennesaw State University (KSU) led survey research and analysis at KSU. Dodonova is assistant director of the Econometrics Center at KSU. **PROFESSOR DONALD SABBARESE**, Director of the Econometrics Center, is a co-leader at KSU, conducting analyses for the Georgia Manufacturing Survey.



ADAM BECKERMAN is the partner in charge of Habif, Arogeti & Wynne, LLP's manufacturing and distribution group, which is one of the largest practices in the Firm. Beckerman has been enabling the success of manufacturers that are starting-up, growing or getting ready for an equity event for more than 18 years. He is also recognized as a thought leader on manufacturing trends and business issues.

“Georgia manufacturers have benefited over the last year or so from economic recovery and are more profitable. Yet, they also indicate problems with basic and technical workforce skills and there are concerns that investment in innovation and new technology is lagging.”

PHILIP SHAPIRA

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