THE GEORGIA ASSOCIATION OF MANUFACTURERS' INSIGHTS REPORT

I VISITED ONE OF THE OLDEST manufacturing factories in Georgia. The building was from the 19th century. Some of the equipment was from the 1940's—but still in use and making products today. Next to this equipment was something new: a robotic arm for cutting space-age ceramics that would take the business forward.

Standing in one spot, I saw the past, present, and future of manufacturing.

If that factory could talk, what story would it tell? In which ways would it have changed its workers' lives? What kind of contributions did it make to its community and state? Where did its products go and to whom?

The story of our industry needs more telling. The Georgia Association of Manufacturers' (GAM) *Insights Report* aims to do just that. Much like my factory visit, in this one publication you will discover the past, present, and future of manufacturing in Georgia.

You will read that manufacturing is much more than making things. It is about human ingenuity and invention, jobs becoming careers, value generation for the economy, and long-term contributions to communities across the state, many in rural areas. It is also about transformation so profound that in the act of turning raw material into finished goods, manufacturing—in turn—transforms itself.

Manufacturers and the work they do is a story worth telling. They serve as the inspiration for this report, which also aims to change the perception of an industry too long misunderstood, too often mischaracterized as "dark, dirty, and dangerous."

In reading the report, my hope is that you gain insight from its insights and become inspired to discover more.

I thank my team, Kelli Criss, PhD, Marianne Campbell, PhD, GAM's board of directors, and the many others who made this report possible.

LLOYD AVRAM
PRESIDENT AND CEO
GEORGIA ASSOCIATION OF MANUFACTURERS

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INTRODUCTION

IN 2025, the Georgia Association of Manufacturers (GAM) celebrates its 125th anniversary. As the only association in the state founded by manufacturers for manufacturers, we honor our legacy of serving as the industry's advocate. To commemorate GAM's heritage, we worked with our members and stakeholders to develop this *Insights Report*, consisting of 5 compelling perspectives that define the past, present, and future of the industry, namely:

- Manufacturing Transforms
- Manufacturing Matters
- Makers Making
- Maintaining Momentum
- Moving Ahead

These "Insights" aim to capture public interest, challenge assumptions regarding manufacturing, promote awareness and understanding about Georgia's manufacturing subsectors, spark discussion about manufacturing, define the issues and risks facing the industry, and propose mitigating actions to address these challenges.

As the definitive source for information and outlook on the industry, GAM believes the report serves as a key vehicle to tell the story of manufacturing in our state. The report not only compiles existing research and additional documents, but also contains original research, gathered through interviews with industry experts, and quantitative analysis.

We invite readers to study this report and share the dynamic story of manufacturing in Georgia.

INSIGHT 1

MANUFACTURING TRANSFORMS

GEORGIA ASSOCIATION of MANUFACTURERS

PHILADELPHIA, DECEMBER 5, 1791, Alexander Hamilton, the first US Treasury Secretary and a founding father of our nation, submits a nearly 32,000-word report to the US House of Representatives. His mission? To inspire the development of an industrial economy.

In his *Report on the Subject of Manufactures*, Hamilton presents a compelling case for why an emerging America needs to grow into something more than a cultivator of land. He explains the "principal circumstances" for why manufacturing establishments "not only occasion a positive augmentation of the Produce and Revenue of the Society, but that they contribute essentially to rendering them greater than they could possibly be without such establishments."[1]

To restate in more modern terms, Hamilton suggests that manufacturing would benefit American society in multiple ways:

- more job diversity,
- more skilled workers,
- increased productivity through the use of highly efficient machines, and
- accelerated innovation that unlocks a young America's productive power.

Sadly, the fruits of Hamilton's seminal report turned out to be minimal, at least in the short-term. Congress primarily shelved his proposal due to political divisions and tense discourse around how policies would be carried out. However, his efforts were prescient—a perspective emerged that would become the foundation for American manufacturing today.

There is so much to discuss about manufacturing and this report strives to hit the highlights. From the beginning, let us start with a working definition of what manufacturing is—and is not.

TRADITIONAL MANUFACTURING AND CONTEMPORARY TECHNOLOGY

In its simplest terms, manufacturing is two things: 1) transforming raw materials, substances or components into finished products and 2) assembling products into other products. Iron ore can be turned into steel—used to make car wheels and bumpers, which, ultimately, are components of automobile assembly. This seemingly straightforward manufacturing definition can even apply to artisan or cottage industries as well (i.e., bakeries, candy stores, and custom tailors). However, the business of manufacturing today is defined and measured by constant adaptation: the ability to respond to globalization, societal changes, and advances in engineering technology.

WHAT DO MANUFACTURERS THINK?

Brad Powell, Vice President of Sales Operations at Hoshizaki America Inc., an ice machine manufacturer, asserts that change is the only constant in manufacturing. "Manufacturing constantly evolves, and you must be able to adapt to change. As manufacturing leaders, we all realize that strategy without action is insanity. There must be a true action plan to continue evolving."[3]

Power-driven machines characterize manufacturing.

US manufacturing comprised $2.94 trillion in value added to the economy in Q4 2024, according to the National Association of Manufacturers (NAM).

Ultimately, the industry known for transforming materials into products is continually transforming itself.

Broadly speaking then, the manufacturing sector encompasses "establishments engaged in the mechanical, physical, or chemical transformation of materials, substances or components into new products" from establishments that "characteristically use power-driven machines and materials-handling equipment." Plants, factories, or mills are labels the US government uses for manufacturers that process materials or contract others to do so.[2] The current acceleration and adoption of technologies blur manufacturing's traditional, historical definition, however. Not only have changes happened in terms of the "things" that go into making products, but the process has evolved. The traditional, seemingly straightforward definition of manufacturing is more complex now due to the ever-evolving nature of technology.

COUNTING GEORGIA MANUFACTURERS

The definition of a manufacturing facility is subject to interpretation. While the Bureau of Labor Statistics (BLS) reported 12,882 manufacturing "establishments" in the state of Georgia in the first quarter of 2024, this number includes multiple entities that may not meet any traditional or unilaterally accepted BLS definition.[4] This report's insights are drawn primarily from those Georgia manufacturing facilities who employed more than 10 workers in the first quarter of 2024—there are 4,417 according to the BLS—that meet the qualifications to be considered manufacturing locations due to scale, production equipment, quantity of output, and skill level of employees.

Manufacturing involves human creativity capable of revolutionizing not only production and economics, but also where we settle, work, and live. Four related yet unique overlapping periods of industrial transformation have occurred in various locations across the globe, namely the First, Second, Third, and Fourth Industrial Revolutions (fig. 1).[5] Descriptions of these eras intertwine manufacturing, business, economic, and social conditions.

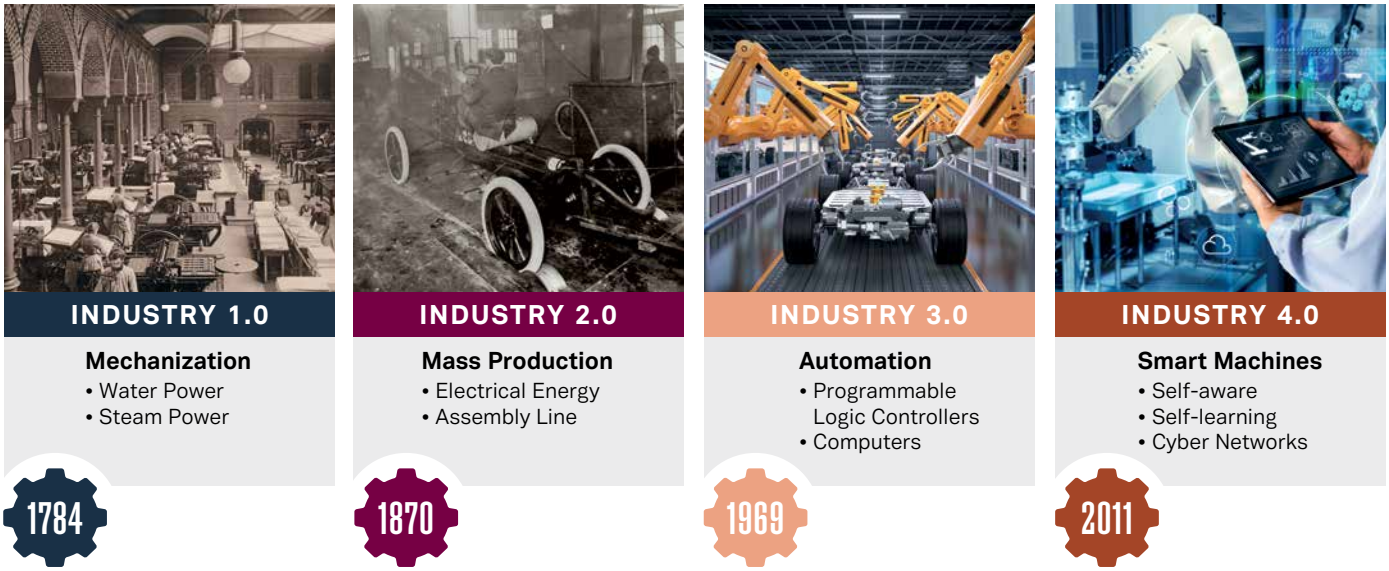

Figure 1. The Four Industrial Revolutions. *Infographic adapted from The Smart Factory Institute.*

INDUSTRIAL REVOLUTIONS: SURGES OF INNOVATION AND ADVANCEMENT

Since the late 1700s, the globe has experienced multiple waves of industrial revolution (fig. 1). Each epoch of industrialization features developments in the areas of geographic commercial relations, supply chain evolution, economic transformation, as well as manufacturing and transportation technological innovation.

INDUSTRY 1.0: 1784-1870

The birth of mechanization launched the First Industrial Revolution. US manufacturing began in earnest after the colonies gained independence from England. Since our nation's founding, Congress has supported the manufacturing sector through various means, like patents and import duties. This period saw innovations like British inventor Richard Robert's steam-powered spinning mule, nicknamed the "Iron Man," that automated spinning in the textile industry in the 1800s (fig. 2).

New inventions and political changes enabled the US to become a global economic power by the 1830s. Eli Whitney's cotton gin (fig. 3) was invented by the early 1790s in Chatham County, Georgia, to divide cotton seeds and fiber. This machine not only saved labor, but also revolutionized the cotton industry and made it a highly profitable crop.[6]

In factories, machine-aided manufacturing transformed production through inventions like Francis Cabot Lowell's power loom and the advent of the integrated factory system, which enabled all textile production processes to occur under one roof.[7] Businesses could scale up and improve the efficiency of production. In parallel, the locomotive enabled transporting of raw materials and the movement of goods and people within and across regions.

As the Napoleonic Wars raged in Europe, Jefferson's 1807 Embargo Act "banned all British ships from US ports and suspended trade with all of Europe."[8] Jefferson's embargo and the British blockade of the Atlantic coastline forced fledgling America to accelerate the manufacturing of its own goods rather than depending heavily on importation.

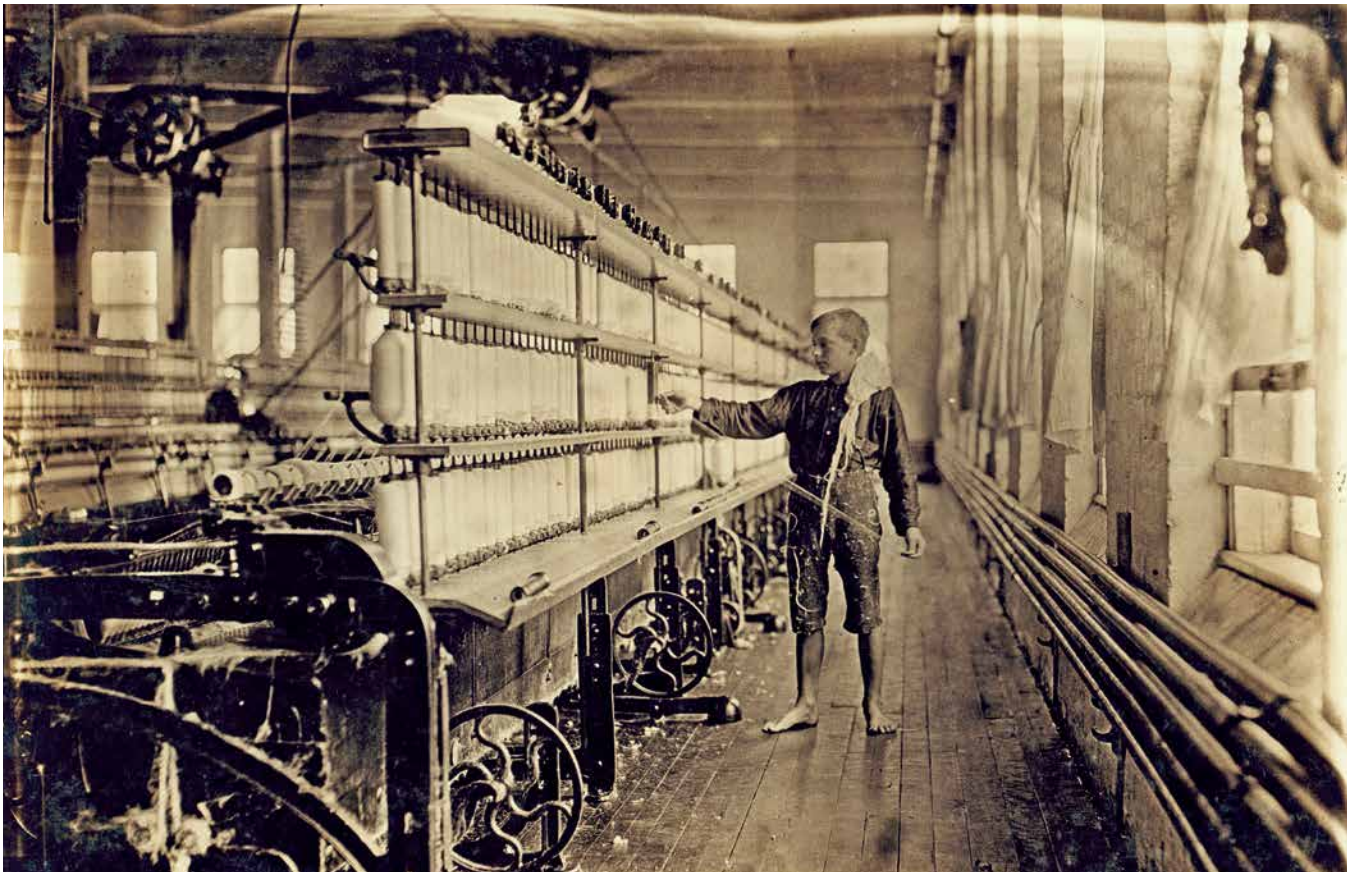

Figure 2. Mule-spinning room in a cotton mill. *Photograph from the Library of Congress.*

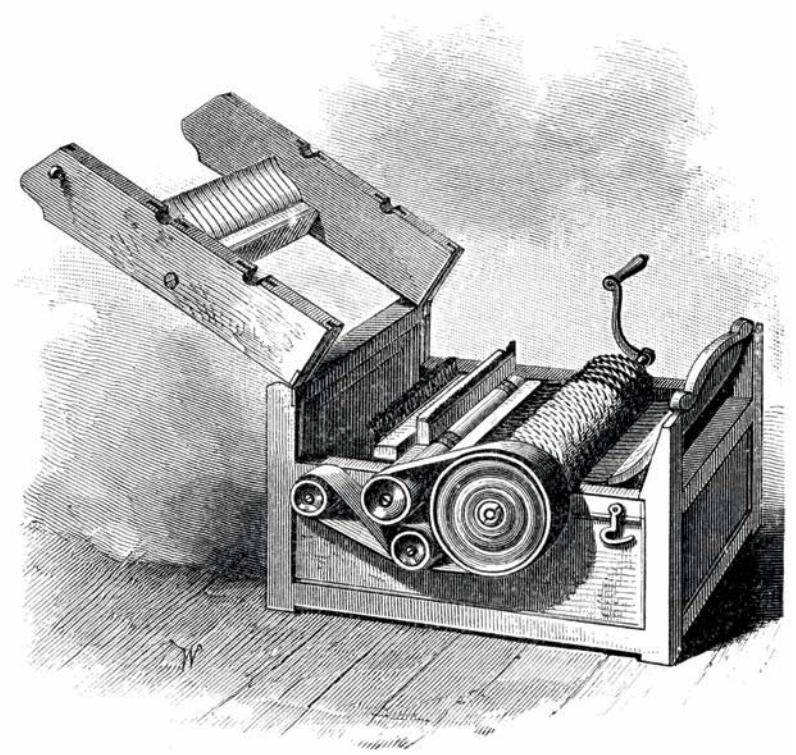

Figure 3.
The cotton gin.
Illustration published in 1881.

The Power of Harnessing Steam: Georgia's Railroad System

As you will see throughout this report, each major era of manufacturing is punctuated with a signature achievement that not only defines the era, but creates an outsized economic and social impact. These achievements could be open to debate, and that debate is welcomed because it amplifies a key point: Manufactured products may very well be the central enabler of human and social progress, not to mention the single largest factor in improving the quality of human life. The locomotive is a prime example. During Industry 1.0, steam locomotives had a revolutionary effect on transportation and human mobility.

The locomotive and the railroad system linked Georgia to the rest of the country and increased movement within the state. Most of the country's railroad system was in place by 1900.[9] With the railroad established, once isolated citizens in rural, agricultural towns gained access to national and international markets to buy and sell goods. The expanse, speed, and reliability of the locomotive was unprecedented—and not subject to ice and seasonal water level changes faced by river and canal travel.[10] Though Georgia's more expansive cities (Savannah, Augusta, Columbus, and Rome) were along rivers and depended a great deal on the steamboat, the railroad provided a critical piece of logistics infrastructure, more jobs, and new business.[11]

In 1835, construction began on the Central of Georgia Railway (fig. 4), linking Savannah to Macon by 1843.[12] Georgia's railroad development spurred "iron foundries, rolling mills, and machine shops, all of which shaped and prepared iron, steel, and other metals" for use by railroads.[13] In turn, the ability of the manufacturing industry to build locomotives and rails at scale spurred economic growth and the development of the nation.

Figure 4. Crowd assembled to meet the train at the Central of Georgia Railway Depot in Norristown, Emmanuel County, whose lumber industry, was stimulated by the arrival of the railroad in the 1870s.
Photograph from the Georgia Archives, Vanishing Georgia Collection, emn004.

INDUSTRY 2.0: 1870-1969

The Second Industrial Revolution was spurred by 2 monumental innovations: the harnessing of electricity and the invention of the assembly line which enabled mass production. By 1884, electricity provided by the Georgia Electric Light Company of Atlanta (now known as Georgia Power) powered street lighting, street railway transportation, and a handful of businesses.[14]

The signature manufacturing achievement in the twentieth century was the invention of the automobile. By 1908, Henry Ford's Model T was rolling off the assembly line (fig. 5), enabling automobiles to be made at scale and at an affordable price for consumers.[15]

As the locomotive broadened the radius of citizens' movement, the car made mobility virtually unlimited. Rural citizens gained access to cities and their array of goods and services. Crowded urban cities began expanding rapidly into the suburbs; goods and services followed. The automobile required better roads, inspiring the "Good Roads" movement (1900 to 1910) that provided highways into rural locations—which in turn attracted businesses such as restaurants, accommodations, and service stations into these untapped markets.[16] All of this led to economic expansion enabled by a manufacturing industry with rapidly growing capacity, capability, and inventiveness.

A stellar example from this period is the home-grown development of "tufting." Catherine Evans Whitener, a Dalton native with a fifth-grade education, began creating tufted bedspreads (fig. 6),[17] eventually called Chenille bedspreads. These tufted bedspreads had "raised 'tufts' of thick yarn," which created a design and gave rise to a tufted bedspread industry.[18] Thanks to exposure created by "extensive railroad traffic," Whitener's enterprise expanded outside of its Geogia birthplace.[19] The cottage industry, emerging from Whitener's ingenuity, led to the industrialization of tufting.

What began as tufted bedspreads soon became the production of small rugs and, later, room-sized carpets—the foundation for Georgia's current carpet industry. Dalton's "carpet boom" began in the 1930s, and by 1952 it was the 3rd largest consumer of Georgia cotton.[20]

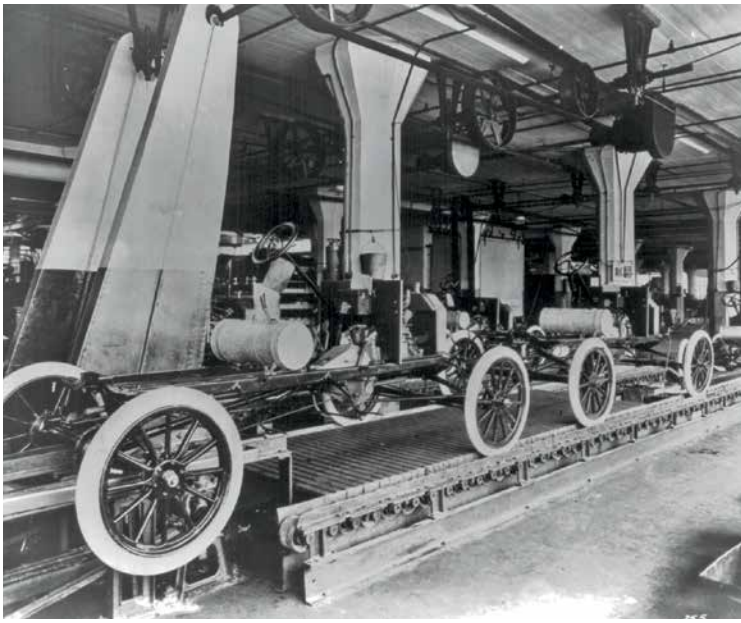

Figure 5. Assembly line at the Ford Motor Company's Detroit Plant.
Photograph from the Library of Congress.

Figure 6. Chenille bedspreads on a line in Dalton, Georgia, credited with laying the foundation of Georgia's carpet industry. *Photograph from Dalton Convention and Visitors Bureau.*

OUTFITTING THE GREATEST GENERATION

During World War II, textile producer Pacolet Manufacturing Company in New Holland, Georgia, received the Army-Navy "Excellence in Production Award."[21] Also known as the "E Award" for superior production assistance to the war effort, this honor acknowledged only "5% of wartime industries."[22]

The textile industry's contribution to the war literally surrounded the soldier according to a US Department of Defense procurement officer: "[I]f you look at a typical soldier, everything that soldier is wearing and carrying, with the exception of his rifle, comes out of the clothing and textile area . . . basic uniform, socks, boots, gloves, underwear, helmet, canteen, and tents and blankets." Companies like Milliken and Georgia's Synthetic Industries outfitted soldiers with everything from landscape cloth used for keeping soil contained to extreme-weather fabrics to keep soldiers comfortable."[23]

Economic Diversity Emerges

By 1947, the variety of Georgia's manufacturing subsectors showed how manufacturing technology shifted Georgia toward a more diversified economy.[24] The state moved away from its historical dependence on agriculture and manufacturing nondurable goods, that is, "products that can be stored or inventoried and that have an average life of less than three years."[25]

Within this diversifying economy, 280,060 workers across 16 subsectors comprised Georgia's 1947 manufacturing employment, dominated by:

- textile mill (38%),
- lumber and wood (16%),
- food (12%),
- apparel (11%), and
- chemicals and allied products (4%).

Textile mill products boasted such an outsized portion of manufacturing employment that it represented a 22% larger share than the 2nd ranked lumber and wood products.[26]

INDUSTRY 3.0: 1969-2011

The Third Industrial Revolution brought automation and information technology, such as computers, the internet, and advanced robotics. That does not mean the industries that built Georgia's economy were left behind—quite the contrary.

For example, Industry 3.0 innovations offered leaps in progress and a huge growth period for Georgia's textile and carpet industry, even with shifts in the global economy and America's regulatory climate. In 1960, the "40 largest companies within Georgia's textile industry . . . operated 66 plants, employed 35,236 workers, had a payroll of $151 million and gross sales of $72.5 million." By 1965, Georgia's textile industry was booming as "sales of textile-mill products increased by millions over the previous decade."[27] The upswing dwindled in the stricter federal regulatory environment of the 1970s.

The 1980s marked transformations by companies that bet on denim, which was popularized in the 1960s by blue jean maker Levi Strauss. Swift Textiles in Columbus eventually changed its name to Swift Denim, doubled its capacity, and by the late 1980s was producing "over 176.5 million linear yards of denim each year"[28]—roughly enough to stretch from Atlanta to Paris over 20 times. By 2000, "Georgia textile companies consume[d] close to 5 billion pounds of [synthetic] fiber annually, making Georgia the second-largest textile-producing state in the country."[29]

In the same year, food manufacturing (12%) occupied the top rank, overtaking the state's previously dominant textile subsector. Total manufacturing employment in 2000 numbered 518,063 workers among transportation equipment (9%), textile mills (9%), textile product mills (8%), and fabricated metal product (6%).[30]

Transportation Begins Its Ascent

The textile subsector's drop from its 1940s and 1950s domination was due to foreign competition forcing plant closures and offshoring (the relocation of US manufacturing to other nations).[31] Offsetting this decrease was the notable rise in transportation equipment manufacturing—including production in automotive, airplane, boat, and rail. In 1947, this subsector represented a mere 1% of manufacturing

employment. From 1982 to 2000, its employment growth jumped 28%, which delivered 122% of manufacturing value added to Georgia's economy during the period.[32] To better understand this value-added growth, consider motor vehicle production. It requires assembly plants and myriad support industries and has been a "large source of jobs across the South since the mid-1980s."[33]

The upsurge in Southern manufacturing during the mid-twentieth century resulted from focused efforts by states and localities to attract large firms beyond the textile and apparel subsectors traditionally present in the South. Likewise, "federal government expenditures, particularly in defense-related industries, helped to drive Southern manufacturing" as well.[34]

Finally, according to a 2006 report about the status of manufacturing in the South, the confluence of multiple factors and stakeholders converged to create an environment conducive to growth in transportation equipment manufacturing. These factors included:

- the "development of a reliable transportation infrastructure,"
- "local bond issues,"
- "low wages," and
- "relatively low unionization rates."[39]

Today, Georgia's transportation equipment manufacturing serves as a testament to the positive conditions that enable expansion. The sector now includes the production of electric vehicles and batteries, tires, buses, off-road vehicles, and a host of precision parts and components. While these subsectors are emerging, Georgia's major legacy sectors are experiencing significant growth as illustrated in Table 1. The composition of today's industry as it evolves through its next evolution—Industry 4.0—stands in contrast to the manufacturing profile from decades earlier.

AUTOMATION BRINGS INDUSTRIAL ROBOTS TO AUTOMOBILE MANUFACTURING

Industry 3.0's automation and robotization are among the era's crowning achievements. Fast, large, powerful robots entered automotive manufacturing. These robots were "fenced off"—physically separated from human workers via barriers or other fencing due to the need for safety precautions during operation. Welding was a typical function of this era's robots.[35] Although they lacked the safety features of today's robots, such as sensors, these machines handled heavy payloads, performed basic pick and place tasks, and conducted high-speed movements.[36] As early as 1961, prototypes emerged at General Motors factories with Ford quickly following suit.[37] The arrival of the first integrated circuit in 1970 marked an acceleration in the automation race.[38]

Table 1. Comparison of Georgia's Top Five Manufacturing Employment Subsectors in 1947, 2000, and 2024.

Ranking	INDUSTRIAL REVOLUTIONS		
	Second (1947)	Third (2000)	Fourth (2024)[40]
1st	Textile Product Mills (38%)	Food (12%)	Food (17%)
2nd	Lumber and Wood Products (16%)	Transportation Equipment, Textile Mills (9%)	Transportation Equipment (14%)
3rd	Food and Kindred Products (12%)	Textile Product Mills (8%)	Fabricated Metal Products (8%)
4th	Apparel and Other Finished Products (11%)	Fabricated Metal Products, Plastics and Rubber Products, Machinery, Wood Products (6%)	Machinery, Plastics and Rubber Products, Textile Product Mills (6%)
5th	Chemicals and Allied Products (4%)	Paper, Chemical (5%)	Chemical, Wood Products (5%)

INDUSTRY 4.0 AND BEYOND

Since 2011, manufacturing has been in its 4th generation of continuous innovation. Industry 4.0 is an era marked by the evolution and integration of computers, data, and automation.[41] This convergence is evident in General Electric (GE) Appliances' Roper facility in LaFayette, Georgia. The company uses robots to perform assembly line tasks such as programming control boards and rotating units to give operators improved access as they make products on the assembly line (fig. 7). GE's manufacturing now includes internet-connected appliances—a response to consumer demand for manufactured goods packed with more intelligence and capability.

Figure 7. Senior Advanced Manufacturing Engineer in Robotics, Brent Freeman, showcases new robotic arms performing various tasks on the assembly line at GE Appliances' Roper facility.
Photograph from GE Appliances.

The increased application of software, robotics and artificial intelligence in Industry 4.0 continues to blur the boundaries between physical and digital realities.[42] Although the technology powering the 4.0 "smart factory" is not new, the integration, combination, and collaboration among 3.0 technologies is novel—shaped by robotization, artificial intelligence (AI), and a complex globalized economy. Businesses contend with the rapidly shifting "demands of the global consumer" and quickly accelerating "advanced digital technologies (i.e., sensor technologies, big data, and artificial intelligence)."[43] Industry 4.0 confronts these shifts by enabling the review and analysis of data, providing crucial understanding and allowing maximum adjustability.

Industry 4.0's "connected automation" is spreading across the industry globally,[51] but implementing technological innovation will take longer than we think for all manufacturers to benefit. Only 1.5% of manufacturers—namely, large manufacturers—are able to capitalize on these advanced technologies. Given that 98.5% of manufacturing companies in the US are small manufacturers,[52] the majority may struggle to implement a "smart factory," according to Denise Hall at the Smart Factory Institute—an exclusive organization which is part of a global network of technology academies partnering with large and small manufacturers. That aside, the future of manufacturing is "projected to introduce a complete digital ecosystem featuring virtual customer interface, virtualized processes, virtual chain networks, and a completely connected" industry.[53] GAM aims to support the needs of all manufacturers and embraces Industry 5.0's future: an expanded focus on "digitalization and AI-driven technologies for increasing the efficiency and flexibility of production." These advancements must be accompanied by "research and innovation to support industry in its long-term service to humanity."[54]

In the next Insight, we delve deeply into the economic and social value of Georgia manufacturing to build an understanding of the current manufacturing landscape.

WHAT DO MANUFACTURERS THINK?

Todd Shail, Senior Vice President of Residential Operations for Mohawk Industries, contends that, "Over the past thirty years, technology has advanced leaps and bounds, especially in automation. We're automating processes today that we didn't even think were possible 30 years ago. We couldn't even have begun to think about such advancements. This has been a huge transformation. Now, we are working to employ and stay ahead of these automation advancements."[44]

DEFINING ARTIFICIAL INTELLIGENCE

According to the National Association of Manufacturers (NAM), AI is a "critical emerging field" incorporating "a large umbrella of technologies that include machine learning, machine vision, and deep learning." AI can give "recommendations or decisions that emulate human behavior."[45] In manufacturing, sensors and instruments connect machines and collect information/data across a facility, supporting machine learning or analytics through advanced algorithms and pattern recognition that help train AI for efficient decision making and task performance.

Machine learning began emerging in the 1980s.[46] Developed in the 2010s, deep learning imitates the activity of the human brain through varied levels of reasoning and data analysis (fig. 8). Likewise, generative AI creates new content based on data by using machine learning to analyze patterns in data and to generate outputs that are realistic. Chat GPT and Google Gemini are recent generative AI innovations.[47]

According to NAM's 2023 survey of its Manufactuing Leadership Council,[48] machine learning and deep learning are the foundation of AI manufacturing tools, enabling manufacturers to have "insight into the performance of a manufacturing process . . . to determine a process's efficiency, speed, equipment utilization, materials usage, waste, etc," and to "mak[e] decisions on how any of these facets could be improved." The survey revealed that 74% of participants either had already invested or had plans to invest in machine learning.[49] These advanced manufacturing tools, such as AI, support manufacturers in practical ways by making "their shop floors safer," helping "improve work experience," and "creat[ing] innovative products that solve global challenges."[50]

GAM ADVOCATES FOR STREAMLINED AI DEVELOPMENT

In 2024, GAM presented before the Georgia General Assembly's Senate and House Study Committees on Artificial Intelligence. GAM's presentation emphasized the need for Georgia's AI policies to harmonize with those of other states/countries to promote uniformity and avoid a "patchwork" of potentially complex and costly rules. GAM also called for the State to support workforce development, in particular, to meet the need for "smart workers" trained for the new world of AI—achieving a shift in work from "backs to brains."

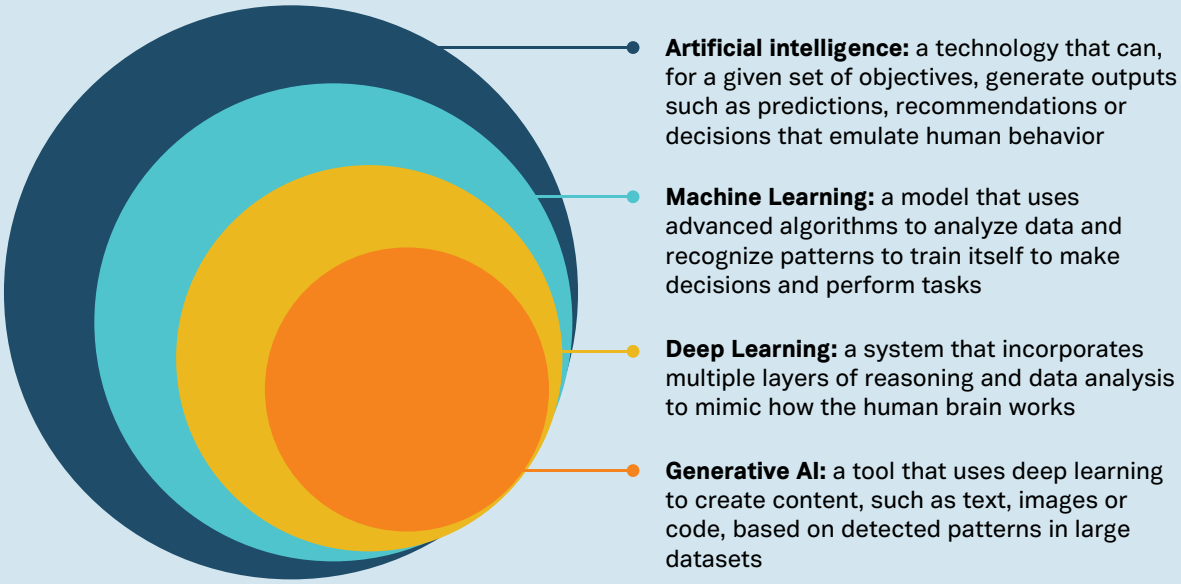

Figure 8. Defining artificial intelligence's various components.
Infographic adapted from the National Association of Manufacturer's 2024 AI White Paper.

ONGOING INNOVATION AND TRANSFORMATION

- **Traditional Definition of Manufacturing:** The United States' government defines the manufacturing sector as including "establishments engaged in the mechanical, physical, or chemical transformation of materials, substances or components into new products."[55]
- **Continual Metamorphosis:** Historically, manufacturing has repeatedly transformed nations' economies around the globe through 4 industrial revolutions characterized by technological advancements.
- **Contemporary Definition of Manufacturing:** Industry 4.0 is the current technology-transformed era we live in, when nonphysical inputs (i.e., the internet and software) and "smart factory" production processes have expanded the more traditional definition of manufacturing.
- **Galloping Ahead:** Considering the changes manufacturing has experienced, the industry has advanced from the simplicity of the cotton gin to robots and AI in only a few hundred years of human progress.

(opposite page) Continuous real-time data exchanges characterize Industry 4.0's digitally interconnected and technology-intensive environment.

ENDNOTES

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INSIGHT 2

MANUFACTURING MATTERS

GEORGIA ASSOCIATION of MANUFACTURERS

GEORGIA IS AN ECONOMIC POWERHOUSE, boasting a gross regional product (GRP) of $678.2 billion in 2023, the 8th highest among US states and the District of Columbia.[1] Compared to 193 nations, Georgia's GDP ranks 22nd—elevating the state as a global competitor in economic output.[2]

Central to this success is Georgia's manufacturing sector, employing 426,940 production workers responsible for $77 billion output across 21 subsectors in Q1, 2025.[3]

Manufacturing's ripple effects extend far beyond factory walls. According to the US Bureau of Economic Analysis, $1 dollar spent in manufacturing adds $2.79 to the economy—the highest multiplier effect of any industry.[4] The impact extends to job creation in related sectors, such as logistics, retail, and professional services; to put this in perspective, in 2022, manufacturing accounted for 11% of US GDP, yet it drove 35% of the nation's productivity growth and 60% of exports.[5] Manufacturing's ability to generate a wave of economic benefits ensures that investments in the sector have long-lasting impacts on local and regional economies.[6]

This section explores:

- the advantages of manufacturing,
- conditions that make manufacturing impactful in the state,
- industry challenges specific to Georgia, and
- future potential of the state's various manufacturing subsectors.

MANUFACTURING'S UNIQUE ADVANTAGES

Operational longevity, productivity rate, employee benefits, innovative technologies promotion, and tax base contributions—clearly, manufacturing's financial contributions are considerable. But it is the societal benefits that inspire passionate support and defense of manufacturing jobs in communities across America.

ANCHOR BUSINESSES

Anchor businesses are those that "by reason of mission, invested capital, or relationships to customers or employees, are geographically tied to a certain location."[7] with at least 1,000 employees at a single location.[8]

In Georgia, manufacturing presents the largest share of anchor businesses (22%). Communities with an anchor business have a lower score for economic distress compared to those without.[9]

A landmark 2017 study looked at how 13 of the largest manufacturing companies in the US addressed economic stability, food security, and healthcare improvements.[10] The findings reveal many of the ways anchor businesses can strengthen community stability and address systemic health disparities, as seen in Table 2.

Anchor businesses are also tied to educational investments. Many Georgia manufacturers fund scholarships and workforce development programs in partnership with technical colleges and universities. These commitments address immediate skills gaps and enhance long-term economic mobility for community members.

Table 2. Economic, Social, and Health Benefits of Thirteen Manufacturing Anchor Businesses.[11]

Social Determinants of Health	Priority Areas for Community Investment	Example Initiatives
Economic Stability	Poverty alleviation and economic development	Funding food banks, workforce readiness programs, supportive housing for the homeless
	Low-income mothers and children	Shelters for victims of abuse, diaper bank, expanding access to mental health services in schools
Neighborhood/Physical Environment	Nurturing communities	Organizing street investments, community gardens, tree planting along sidewalks
	Improving safety	Expanding local hospital safety programs, child passenger seats, bike helmets, teen driver safety programs
	Improving access to affordable housing	Supporting Habitat for Humanity and providing supplies to new homeowners
Education	Enhancing STEM education	Supporting robotics competitions, establishing STEM-focused schools, and hands-on STEM programs
Food	Food access/hunger relief	Increasing availability of healthy food in corner stores, breakfast in classrooms
	Improving nutrition	Gardening and educational programs to promote healthy eating
Community/Social Context	Promoting healthy lifestyles and active play	After-school programs for at-risk children, nutrition education, and physical activity programs
	Support for the arts	Supporting underserved communities in performing, visual, or literary arts
Health Care System	Support for front-line health providers	Expanding access to primary and dental care in community health centers
	Children's health care	Funding household lead abatement programs
	Community investment	Donations to local hospitals
	Improving health and confidence for those in need	Helping women donate hair to be turned into wigs for women with cancer

GEORGIA CABLE MANUFACTURER SOUTHWIRE'S "12 FOR LIFE" INITIATIVE COMBINES ACADEMIC SUPPORT WITH ON-THE-JOB TRAINING, SIGNIFICANTLY REDUCING DROPOUT RATES IN ITS TARGET DEMOGRAPHICS.[12]

RURAL STABILITY

Manufacturing is particularly crucial in Georgia's rural areas, where it represents a larger share of both jobs and earnings. According to a 2017 report, in rural areas as opposed to urban, manufacturing represented greater shares of both private non-farm jobs (14% vs. 7%) and earnings (21% vs. 11%).[13] Furthermore, among all rural sectors of the economy, only mining had higher wages than manufacturing.[14]

These plants do not just provide stable employment. They also foster community development and long-term economic stability. The presence of manufacturing in rural areas also supports other local businesses, creating a network of economic activity benefitting the broader region. Moreover, manufacturing jobs offer a 14% wage premium for workers without college degrees.[15]

In a 2023 comparison provided through Lightcast by Georgia Power, Georgia's mostly rural counties generated $88 million more tax revenue than the metropolitan statistical areas (MSA) and surrounding counties of Georgia's three most populous cities (Atlanta, Augusta, and Columbus). On a per-manufacturing job basis, tax revenue was higher in rural counties ($4,846) versus regions containing 1 of the 3 largest cities ($4,756)—resulting in nearly $21 million more tax revenue from 230,000 manufacturing jobs in rural counties.[16]

ENDURANCE AND DURABILITY

Manufacturing as an industry has the third-highest business survival rate, behind only agriculture and utilities, according to 20 years of data from the Bureau of Labor Statistics.[18] This means manufacturing stabilizes local economies during periods of economic recession, attracts complementary businesses, and provides tax revenue supporting local schools, infrastructure, and community services. Many of the oldest Fortune 500 companies are manufacturers, with subsectors like food and beverage/motor vehicles leading in longevity.[19] This endurance underscores manufacturing's ability to adapt and thrive through economic shifts.

Lower property taxes, land prices, and cost of living make rural Georgia attractive for manufacturing facilities; these businesses also tend to have higher survival rates than their urban counterparts (see sidebar). Independent rural plants, often deeply tied

HOW DO SMALL MANUFACTURERS THRIVE IN RURAL COMMUNITIES?

West Point Industries in West Point, Georgia, is a remarkable story of resilience. Founded in 1868 by two brothers, the firm has undergone multiple transformations over more than 15 decades to remain vital and viable as economic landscapes change. Originally producing iron castings for the textile industry, and then expanding to textile machinery, domestic sales shifted internationally before the relocation of textile manufacturing to East Asia prompted a change to contract manufacturing.

West Point Industries currently operates a foundry and machine shop, now serving infrastructure, agriculture, and machinery manufacturers in the United States. Through structural fabrication, they serve infrastructure, agriculture, and machinery manufacturers in the United States. A shining example of family stewardship, West Point Industries has been owned by the Huguley family since 1931 and is on its fourth generation of family leadership in President Pate Huguley. Huguley's great-grandfather purchased the company during the Great Depression, and he credits "hiring good people" for being able to reinvent the company multiple times.[17] Huguley's father, West Point President at the time, "slid the keys over" to his son who was then aged 28. As of 2025, there are multiple employees with more than 40 years of continuous employment with West Point Industries.

In 2023, 39.27% of Georgians lived in rural areas where manufacturing contributed more tax revenue than metropolitan statistical areas.

to their communities, have a 59% survival rate over 15 years, highlighting their resilience and importance to local economies.[20]

Its adaptability ensures that manufacturing remains a cornerstone of Georgia's economy. Moreover, the industry's focus on innovation—from automation to green manufacturing practices—positions it to remain competitive in a rapidly changing global market.

HIGH PRODUCTIVITY

Manufacturing productivity has surged due to technological advancements.[21] For instance, producing a ton of steel now takes 1.5 hours compared to 10.1 hours in 1980, illustrating dramatic gains in efficiency.[22] Improvements like these highlight the importance of investing in technology and workforce training to sustain economic growth and increasing opportunities for employees to pursue more specialized, higher wage roles.

SECURE, WELL-PAID EMPLOYMENT WITHOUT EDUCATION DEBT

Research by the Economic Policy Institute reveals that *manufacturing workers earn 13% more in hourly compensation*, including wages and benefits such as insurance and retirement packages, than their private-sector counterparts with comparable education levels.[23] The data highlights that production workers receive better retirement benefits (75% vs. 47%), medical care (83% vs. 47%), and paid holidays (94% vs. 54%) compared to service-sector employees. These benefits significantly enhance mental and physical health outcomes for manufacturing employees.[24]

Manufacturing jobs in Georgia provide stable employment opportunities with competitive wages (Table 3). For example, in 2023, manufacturing workers in Georgia earned a median hourly wage of $33.25—surpassing wages not only in transportation, retail and hospitality, but those of "degreed" roles in education and health services, which require costly and lengthy post-secondary education.[25] Many manufacturing jobs require only a high school diploma or GED, eliminating the financial burden of college debt.

Government-supported training programs such as On-the-Job Training (OJT) through the Workforce Innovation Opportunity Act (WIOA) further enhance accessibility to manufacturing careers. These programs ensure workers can gain specialized skills—earning a paycheck and avoiding additional educational costs.

Manufacturing apprenticeships also play a key role in addressing skills shortages. Resources available through Georgia's 22 technical colleges, along with other educational institutions across the state, offer customized training solutions tailored to manufacturers' acute workforce needs. By equipping workers with industry-specific certifications, these programs open pathways to long-term career growth. In addition to apprenticeships, public-private partnerships have expanded funding for vocational programs in rural areas—helping to keep manufacturing jobs accessible to underrepresented groups which fosters equity in economic opportunity.

TECHNOLOGICAL INNOVATION AND GROWTH

US manufacturing accounts for 55% of patents and 70% of all research and development spending in our nation.[31] Advanced manufacturing, a hallmark of Industry 4.0, has reimagined and automated traditional processes with robotics, artificial intelligence (AI), 3D printing, and the Internet of Things (IoT)—all of which increase productivity, reduce costs, drive technological transformation, and open new doors for skilled workers.[32]

For example, AI-driven predictive maintenance systems can minimize equipment downtime, while IoT sensors enhance supply chain visibility. These technologies are particularly vital in aerospace and automotive manufacturing, both of which require precision and scalability.

Commonly known as additive manufacturing, 3D printing presents significant opportunities for rapid prototyping and production of complex components with shorter lead times and less material waste. Georgia's investment in advanced manufacturing hubs, such as the Georgia Tech Manufacturing Institute, helps expand access to these technologies, enabling underperforming areas to compete more effectively.

LOW DEMAND FOR PUBLIC SERVICES

Manufacturing contributes significantly to Georgia's tax base while using fewer public resources than residential or retail developments. Industrial facilities generate higher property taxes per acre and

Table 3. Manufacturing's Hourly Earnings Exceed Wages in Specific Service Sectors in Georgia and the US.

Industry Sectors	Minimum Education[26]	2000		2023	
		US[27]	Georgia[28]	US[29]	Georgia[30]
Manufacturing	**HS Diploma / GED**	**$14.37**	**$12.99**	**$27.28**	**$33.25**
Education & Health Services	A.A. / B.A.	$13.55	$14.83	$25.06	$31.40
Transportation	HS Diploma / GED	$14.70	$19.45	$27.23	$30.65
Other Services	Varied	$12.41	$11.13	$20.88	$23.88
Retail Trade	HS Diploma / GED	$10.58	$10.40	$15.69	$19.33
Leisure and Hospitality	HS Diploma / GED	$8.05	$6.33	$11.72	$17.29

lower demand for public services like schools and public safety. Additionally, it is estimated that each manufacturing job gives rise to 7 to 12 new jobs in related industries, growing the economy.

AN ECONOMIC MULTIPLIER

How many jobs does it take to create $1M in economic value?[34]

Manufacturing 5.8
Transportation and Service 7.7
Retail Trade 16.9

WHAT DO MANUFACTURERS THINK?

Greg King, President and CEO of Avis Industrial Corporation, explains how his company leverages technological innovation to curb its costs while driving growth: "We're scaling: leveraging the digital capabilities of the world to create a scalable model across 8 vertical markets without adding cost. We're on course to double every 5 years without increasing our SG&A [Selling, General, and Administrative expenses] and without passing additional costs to our customers—a major victory in a fight we wage with companies competing with us from abroad."[33]

CORPORATE CONTRIBUTIONS TO COMMUNITY RESILIENCE

During the COVID-19 pandemic, manufacturing leaders demonstrated their capacity to bolster public health, organizing vaccination clinics and filling critical gaps in local health departments. One example, Kia's "Accelerate the Good" program has provided more than $30 million in aid since 2019, benefiting causes ranging from childhood cancer treatment to disaster relief.[35]

In addition, the Tull Charitable Foundation, Fuller Callaway Foundation, and Abraham J. and Phyllis Katz Foundation, all funded through Georgia manufacturing, contributed over $26 million in 2023 to causes as diverse as education, affordable housing, medical innovation, and access to the arts.[36] These contributions emphasize the enduring value of manufacturers as community anchors.

For 11 consecutive years, Georgia has been ranked the #1 state for business.

GEORGIA'S WINNING COMBINATION

Georgia's leadership in manufacturing stems from its strategic business environment, which includes a favorable location, advanced infrastructure, and a highly skilled workforce. In 2024, Georgia earned top honors in *Site Selection Magazine's* Prosperity Cup for fostering business investment and job creation.[37] This accolade reflects the state's ability to attract and retain major manufacturing projects that have significantly boosted its economy.

In addition, Site Selection Group named Georgia 9th in manufacturing in 2024 based on workforce and market alignment (weighted 40%), operating costs (30%), and geographical positioning (30%).[38] The state also received a Gold Shovel award from *Area Development Magazine*, recognizing its achievements in attracting significant investments and expansions.[39] These awards highlight Georgia's forward-thinking policies and its ability to deliver measurable economic success.

In the Southeast, Georgia is a manufacturing leader, contributing 9.3% of the region's manufacturing employment—a notable share in a territory of 16 states and Washington, D.C. (fig. 9).[40] Georgia's business-friendly climate, low cost of doing business, and access to major consumer markets and ports make it a magnet for manufacturing projects (fig. 10).

Such developments reinforce Georgia's reputation as a manufacturing leader and contribute to its economic resilience. Georgia's manufacturing leadership is due in large part to its infrastructure and energy landscape.

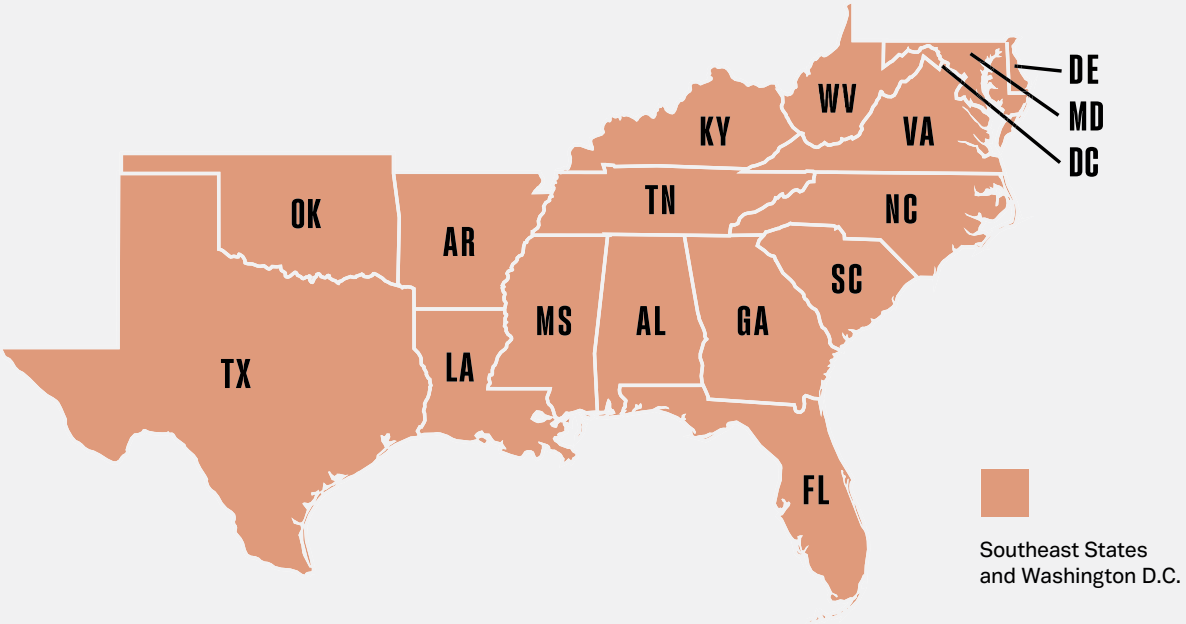

Figure 9. The Southeast region of the United States.

Figure 10. Significant manufacturing facilities in Georgia.

INFRASTRUCTURE AS A CATALYST

Georgia's infrastructure is key to its manufacturing success. Ranked 1st in the nation for infrastructure by CNBC in 2023, the state's transportation network boasts Hartsfield-Jackson Atlanta International Airport, the Port of Savannah, and a comprehensive rail system.[43] The Port of Savannah handled over 2 million twenty-foot equivalent units (TEUs) in 2023, placing it among the top US container ports.[44] Inland ports, such as the Appalachian Regional Port, aid in reducing truck miles and enabling faster cargo movement.[45]

Rail and road networks also play a critical role. Georgia's 4,600 miles of active rail lines make it the largest rail network in the Southeast, while major interstates such as I-75, I-85, and I-95 make it possible to reach 80% of the US market within two days.[46] Additionally, ongoing investments to improve infrastructure reinforce Georgia's competitiveness in the face of evolving economic demands. For example, enhancements to intermodal freight systems are reducing bottlenecks and boosting capacity, which benefits both manufacturers and consumers.[47]

ENERGY INNOVATION

Georgia's energy landscape is another factor in its manufacturing prowess. With two new nuclear reactors at Plant Vogtle, Georgia generates 34% of its energy from nuclear power, complemented by 12% from renewable sources such as solar and hydroelectric power (see fig. 11).[48] The state ranks 2nd nationally in biomass fuel manufacturing capacity and boasts some of the lowest industrial electricity costs in the US, which is a major draw for energy-intensive industries.[49]

These innovations not only reduce environmental impact, they ensure a stable and cost-effective energy supply for manufacturers, especially those involved in high-tech manufacturing and advanced materials production.[50] While natural gas and gasoline are the 2 largest sources of consumed energy in Georgia, nuclear energy is 3rd and biomass is 5th, showing promise for the future (fig. 12).[51]

MITIGATING THE STATE'S CHALLENGES

In 2023, the manufacturing industry experienced a 56% turnover rate, meaning manufacturers faced challenges in retaining 238,421 of the state's 424,205 manufacturing jobs.[52] Solving Georgia's workforce challenges requires innovative solutions and collaboration. GAM has stepped forward to take the lead in novel partnerships tackling manufacturing workforce concerns, in particular. For instance, the association collaborates with educational institutions to align curricula with industry demands, ensuring a steady pipeline of skilled workers. Additionally, apprenticeship programs and reskilling initiatives are being expanded to help workers adapt to new technologies and changing industry needs.

INNOVATIVE WORKFORCE SOLUTIONS

Manufacturing offers a pathway out of poverty for historically marginalized groups. With collaboration from the community, new creative workforce solutions are possible.

In 2025, GAM launched "Manufacturing Georgia"—a first-of-its-kind digital platform that showcases the modernity of Georgia manufacturing and aims to make a direct connection between employers and future employees. The days of dark, dirty, dangerous, dull manufacturing jobs are largely gone with the wind; AI, sophisticated robotics, and other advanced technologies have ushered in a new vision of industry. The Manufacturing Georgia platform will feature social media-like capabilities to engage younger audiences in order to increase the pool of skilled workforce talent Georgia manufacturers urgently need. The platform will be available to the public in mid-2025.

Veterans in Manufacturing

Veterans face unique barriers to employment, including mental health challenges and societal

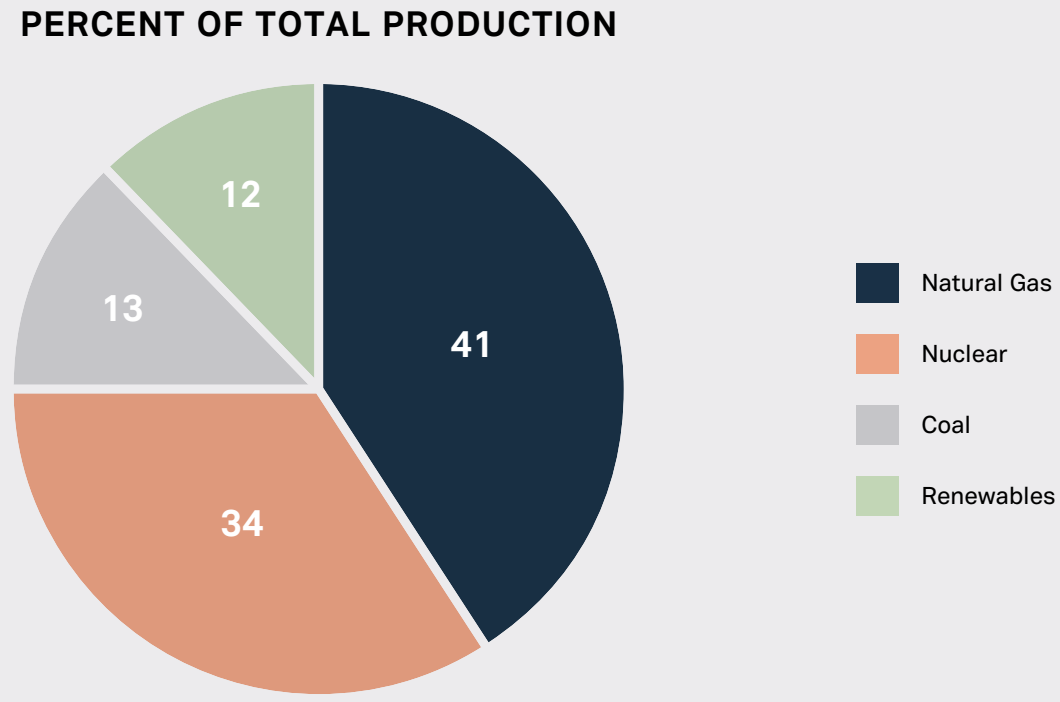

Figure 11. Sources of energy produced by Georgia in 2022.

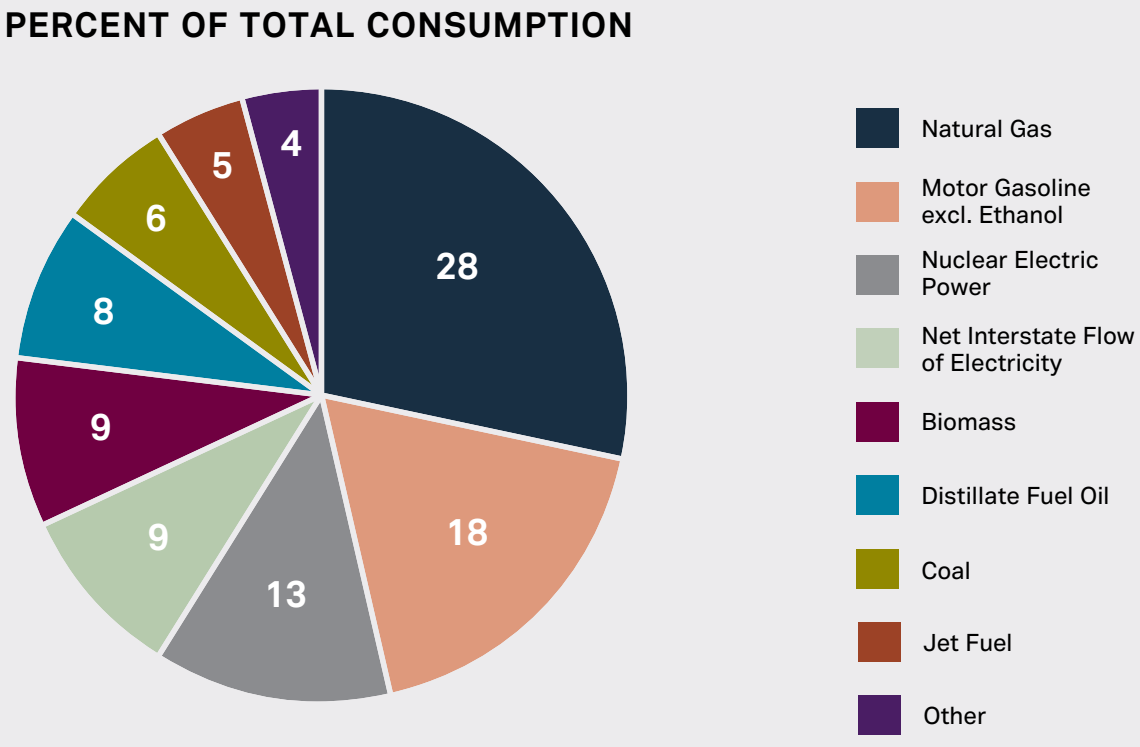

Figure 12. Consumption of energy in Georgia in 2022.

misconceptions. Manufacturing is an ideal sector for these individuals, employing 12% of the veteran workforce. The structured nature of manufacturing aligns with veterans' training in leadership, teamwork, and adaptability.

Veterans' transitions to civilian manufacturing roles are facilitated by programs like Skillbridge and Heroes Make America which are both from the national nonprofit, the Manufacturing Institute. The Work Opportunity Tax Credit (WOTC) and Returning Heroes Tax Credit also support veteran hiring.[53] Beyond financial incentives, manufacturers are also investing in mental health resources that help veterans adjust to civilian life.[54]

Champions of Fair Chances

Fair-chance hiring, which prioritizes individuals with criminal records, addresses workforce shortages while reducing societal costs. Approximately 70 million Americans have criminal records, yet these people often struggle to find work.[56] Studies indicate that once hired, these employees exhibit longer job tenures and lower turnover rates, benefiting employers[57]—and reentry programs have proven to reduce recidivism.

When surveyed, a full 40% of over 100 GAM manufacturing members expressed interest in employing fair-chance hires.[58] GAM works with fair-chance hiring firm Honest Jobs to assist manufacturers in hiring formerly incarcerated people. In fair-chance hiring, background checks are deferred until later in the hiring process, candidates with a conviction history are not automatically excluded from consideration, and the details of the infraction are considered (time since, nature, rehabilitation history, relationship to proposed job duty, etc.).

NATIONALLY, MANUFACTURERS EMPLOY MORE VETERANS THAN ANY OTHER PRIVATE INDUSTRY.[55]

As noted in GAM's Fair Chance Hiring Report, a study by the Economy League of Greater Philadelphia found that putting 100 formerly incarcerated individuals back to work:

- increased their lifetime earnings by $55 million,
- their income tax contributions by $1.9 million,
- boosted sales tax revenues by $770,000, and
- saved more than $2 million annually by keeping them out of the criminal justice system.[59]

TOYO TIRES SUPPORTS FAIR-CHANCE AND EMERGENT BILINGUAL HIRING

Toyo Tires President Patrick Lenz has championed work-based learning programs as part of incarceration, offering a pathway to stable employment upon release.

Acknowledging the difficulty of identifying suitable candidates, Lenz reached out to relevant nonprofit organizations to help recruit. After a justice-involved relative had experienced issues finding employment, Lenz saw the challenges firsthand and offered his assistance.

Through his work with the National Incarceration Association, Lenz learned that potential fair-chance hires often emerge from the justice system without funds and disconnected from their families. In his vision, funding by county, state, and federal programs for training transition periods and wraparound services would aid those newly released to contribute and thrive. He proposes a government-subsidized transition period for second chance hires during their incarceration. Motivated prospective employees can engage in work-based learning, partner with a manufacturing facility, and accumulate a small nest egg of wages prior to release. Separately from his Fair-Chance efforts, Lenz recognized an untapped opportunity: workers for whom English is a second language. Bartow County, Georgia, where Toyo Tires is located, is also home to a significant population of Spanish speakers with limited English skills. Lenz hired Spanish-speaking supervisors which has enabled emergent bilingual employees to thrive and increase their tenure at Toyo—which he attributes to ease of communication and sharing a common culture.

Recruiting Women

Despite representing nearly half of the US working population, women account for only 29% of manufacturing jobs. Attracting more women to manufacturing could significantly reduce workforce shortages. The Reshoring Institute notes that promoting the field of manufacturing to elementary-aged girls and increasing visibility of female leaders in manufacturing are two ways to stimulate interest in this lucrative career path. For the near term, the Institute also advises other measures like offering equal pay, work-life balance options, paths for clear advancement, promoting benefits more broadly, upskilling female leaders, refining internal work cultures, creating mentorship programs, and promoting double-blind application processes.[60]

Individuals with Disabilities

Employment of people with intellectual disabilities increased to 22.5% in 2023, the highest percentage recorded since data collection began in 2008.[61] The development of automation and assistive technologies are providing new opportunities for more people to participate in the workforce.

Organizations such as In Good Company, a GAM partner, support this progress. In Good Company sources, educates, and trains valuable employees who possess intellectual disabilities—and consults with the management team who coach them and champion their productivity.[62]

ENVIRONMENTAL SUSTAINABILITY: A PERSISTENT CONCERN

As technology offers new solutions, environmental considerations remain critical. Energy-intensive industries must balance economic contributions with sustainability. Georgia's leadership in renewable energy, such as biomass and solar power, provides a model for reducing environmental impacts, but investments in energy-efficient technologies and sustainable practices can further enhance the benefits.

Renewable energy sources. Green manufacturing practices. Each of these can significantly reduce a manufacturer's carbon footprint while maintaining productivity. For example, Shaw Industries installed innovative high-density solar technology last year that generates 300 kW of power, which is currently used to produce EcoWorx carpet tile, extending the sustainability of this already green product.[63]

Only one in three manufacturing professionals and one in four manufacturing leaders are women, according to 2020 survey from Women In Manufacturing, a national association dedicated to supporting women in manufacturing careers.

GEORGIA'S MANUFACTURING SUBSECTORS

We've seen that Georgia's manufacturing sector is a linchpin of the state's economy. It is a regional and national model for economic growth, innovation, and resilience. Spanning various subsectors, Georgia manufacturing underscores the interplay between industry-specific strengths, geographic advantages, and strategic investments. This analysis delves into the regional nuances, key subsectors, and opportunities for growth across the state.

CURRENT PERFORMANCE AMONG GEORGIA'S MANUFACTURING REGIONS

Of Georgia's 12,882 payrolled manufacturing businesses, 4,417 employ more than 10 workers.[64] Both Northeast and Northwest Georgia dominate in manufacturing employment, reflecting historical and economic trends. The Northeast, for instance, employs the highest number of workers (96,363) due to its robust food manufacturing subsector. Hall County's dominance in poultry processing highlights this concentration, with the state ranking as the world's seventh-largest producer of broilers. Meanwhile, Northwest Georgia's historical leadership in textiles continues through industry giants like Shaw and Mohawk, employing tens of thousands in Dalton.

Similarly, regions such as Metro North and Coastal Georgia stand out for their diversity and specialization, with Metro North leading in fabricated metals and computer products and Coastal Georgia focusing on aerospace and transportation equipment manufacturing.

In contrast, West, Central, and South Georgia face challenges, including limited infrastructure and fewer manufacturing hubs. For example, the West region's employment is heavily skewed toward transportation equipment manufacturing, while the Central and South regions' strengths lie in agriculture and forestry rather than manufacturing. Targeted investments in infrastructure, workforce training, and industrial parks could unlock potential in these underperforming areas.

STRATEGIES FOR GROWTH

Georgia's manufacturing subsectors present unique opportunities for expansion.

Food and Beverage

Food manufacturing leads Georgia's manufacturing employment with nearly 78,000 jobs. The state's agricultural strengths, such as poultry, peanuts, and peaches, support this subsector. Food and beverage possess potential for growth through:

- expanding value-added processing,
- leveraging cold storage facilities for export, and
- developing export-oriented processing facilities, tapping into global markets hungry for Georgia's agricultural products.

Aerospace

Anchored by Gulfstream Aerospace in Savannah, the aerospace subsector underscores the importance of advanced manufacturing and high-value exports; further development may occur by leveraging existing hubs in Savannah and Atlanta to attract more suppliers and boost exports.

Automotive

The automotive industry, already bolstered by investments from Kia and Hyundai, has the potential to:

- further benefit from electric vehicle (EV) production, and
- establish partnerships with battery manufacturers, focusing on EV infrastructure development to ensure Georgia remains competitive in this rapidly evolving subsector.

Renewable Energy

Including solar panels and wind turbines, renewable energy manufacturing aligns with state and federal incentives, providing a pathway for sustainable growth. This subsector can advance further through investments in bioplastics and other eco-friendly materials which can diversify the state's manufacturing base while addressing environmental concerns.

Chemical industry workers drive billions in revenue—boosting Gross Regional Product (GRP) far beyond their share of total employment. High-output sectors like chemicals anchor regional economies through value-intensive production.

Additional Subsectors

Deciding which subsectors would benefit the most from possible investments demands considering the somewhat disconnected relationship between economic contributions and employment statistics. Economic contributions do not always align with employment:

- Chemical manufacturing's gross regional product outpaces its employment, driven by firms like BASF and DuPont; and
- Aerospace product and parts manufacturing, for example, ranks high in GRP, but employs fewer workers due to its capital-intensive nature.

These discrepancies highlight the potential for growth in subsectors with high-value outputs, even if they are less labor-intensive.

Reflecting Georgia's industrial diversity, plastics and rubber products, machinery, and fabricated metal manufacturing feature prominently. For instance, plastics and rubber manufacturing employs over 26,000 workers, with significant clusters in the Northwest and Metro regions. Focusing on plastics and rubber growth could be achieved through:

- pivoting to sustainable replacements to meet market demand,
- ensuring supply contracts for key inputs (i.e., oil for rubber manufacturing), and
- investing in flexible manufacturing processes.

Insight 3 dives further into the makeup of the state's manufacturing subsectors.

ECONOMIC VALUE AND STABILITY

- **Economic Powerhouse:** Georgia ranks as the eighth largest economy among US states, with a GRP in 2023 exceeding $678 billion. If it were a country, the state of Georgia would rank 22nd out of 193 nations.
- **Economic Ripple Effect:** Manufacturing in Georgia has the highest economic multiplier effect, with every $1 spent generating an additional $2.79 in economic activity.
- **Manufacturing Hub:** Georgia is 6th among US states for manufacturing due to favorable demographics, low business costs, and access to major consumer markets and ports. The state's 426,940 production workers and $77 billion output across manufacturing subsectors during Q1, 2025, make Georgia a manufacturing leader.[65]
- **Award-Winning Business Climate:** Georgia won accolades like *Site Selection Magazine's* Prosperity Cup (top state for business investment) and *Area Development's* Gold Shovel award for business-friendly policies and job creation.
- **Innovation Leadership:** Georgia hosts cutting-edge manufacturing projects, such as the largest solar panel plant in the Western Hemisphere (Hanwha Qcells) and Hyundai's electric vehicle manufacturing hub.
- **Advanced Infrastructure:** Ranked #1 by CNBC in 2023 for infrastructure, Georgia boasts efficient airports, the Port of Savannah (14th in US cargo tonnage), and an extensive rail network, including three inland ports.
- **Energy Leadership:** Home to 2 of the 3 US nuclear reactors built since 2000, Georgia leads in clean energy and offers industrial electricity costs 15% below the national average.
- **Strong Logistics Network:** Georgia's strategic location enables trucks to reach 80% of the US market within 2 days, supported by highways, rail, and intermodal freight facilities.
- **Community Development:** Manufacturing offers high wages and job stability, particularly benefiting rural areas, where plants contribute significantly to local economies and sustain long-term employment. Hiring of veterans and second chances stabilizes communities and individuals.
- **Diverse Manufacturing Subsectors:** Leading subsectors include food processing, aerospace, chemicals, machinery, and paper, driven by firms like Gulfstream Aerospace, Coca-Cola, and Georgia-Pacific.

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INSIGHT 3

MAKERS MAKING

GEORGIA ASSOCIATION of MANUFACTURERS

GEORGIA HAS BEEN AN INNOVATION HUB since our nation's inception. Custom textile products, plywood, paper, pharmaceutical chemicals, kaolin-based products, coffee, carpet, luxury vinyl flooring, custom machine belts, pumps and sprayers, industrial boilers, automobiles, contact lenses, batteries, golf carts, refrigerators, ovens, textile machinery, boats, beer, iron castings, and aircraft—are all products made in Georgia. The state makes products from every possible manufacturing subsector, underscoring the incredible breadth and depth of the industry.

MANUFACTURING'S SUBSECTORS AND GEORGIA'S REGIONS

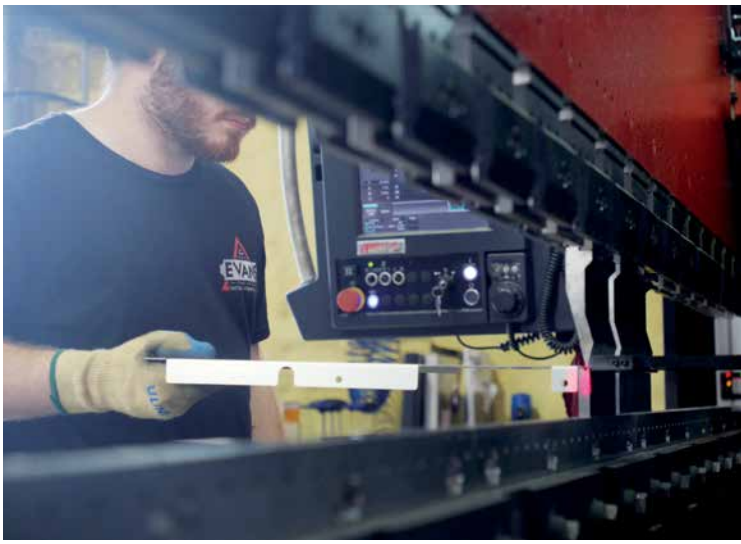
To understand the composition of the industry better, it is essential to explain how manufacturing is classified in the US and to define Georgia's geographic regions.

THE NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (NAICS)

NAICS is a coding system created collaboratively by the US, Canada, and Mexico to provide a consistent way to categorize businesses according to the type of industry and products produced. Manufacturing includes all codes beginning with the digits 31-33. As categories are refined, the numbers increase. For instance, "311" is food manufacturing, "3111" is animal food and "311111" is dog and cat food manufacturing. There are 21 manufacturing subsector codes, each containing 3 digits. Georgia has manufacturers classified under ALL 21.[1]

GEORGIA'S TEN MANUFACTURING REGIONS

Ten Georgia Power Economic Development Regions exist (fig. 13).[2] Figure 13 displays the number of counties within each region. For a complete list of the counties within each region, see Appendix A. These regions manufacture a wide array of products.



Joey Klein uses a brake press to bend parts for a generator at Evans Tool & Die/Evans Metal Stamping, Inc.
Photograph from Evans Tool & Die/Evans Metal Stamping, Inc.

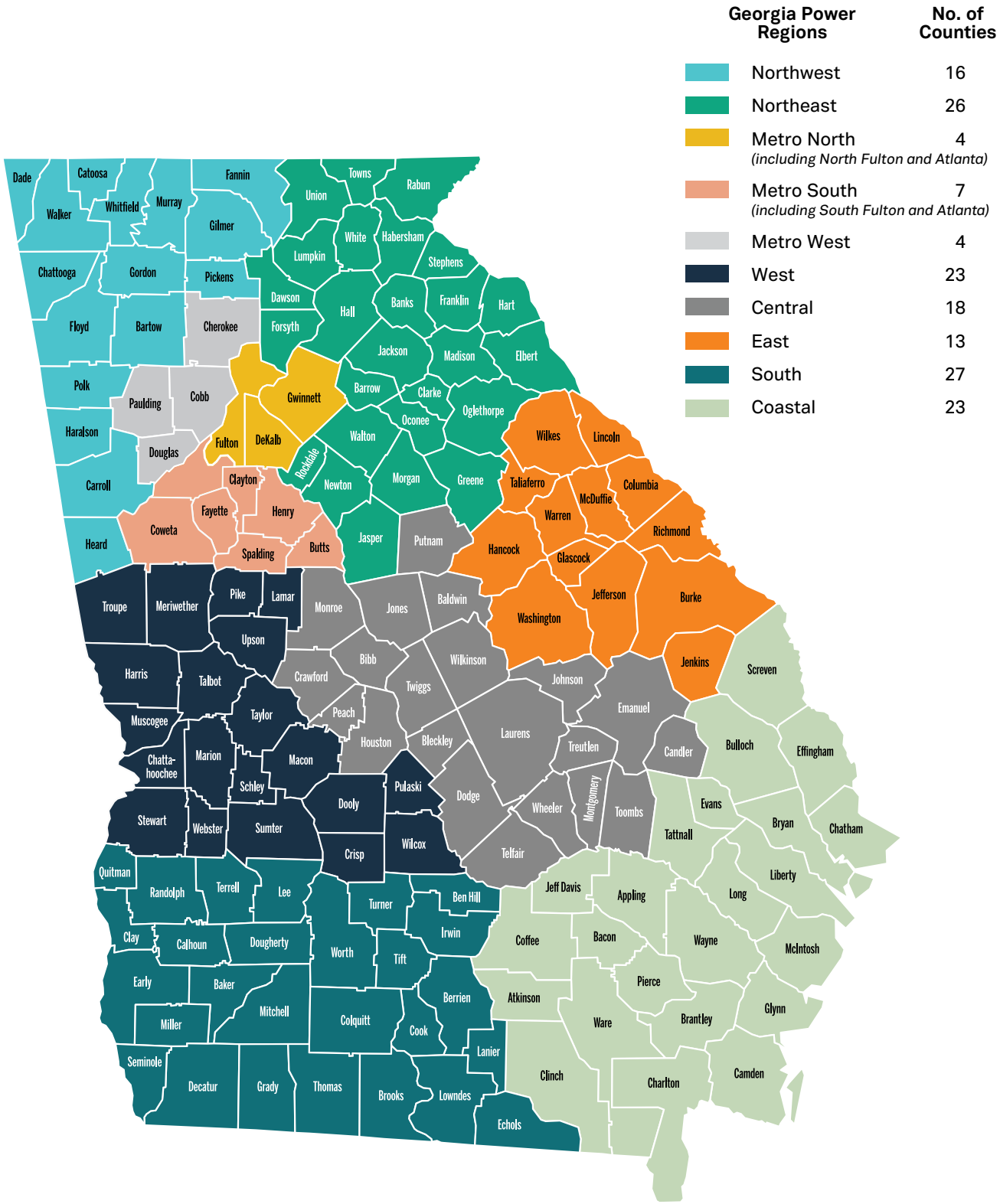


Figure 13. Georgia Power's ten Economic Development Regions and corresponding counties.

NORTHEAST

From Custom Flooring Solutions to Pharmaceutical Chemicals

PRODUCTS

Custom textiles, fabrics (especially denim), performance materials, yarn, and fibers

Flooring products (i.e., luxury vinyl plank)

Pharmaceutical chemicals

Cardboard

Insulated panels and thermal products

Structural metal products

Plastics material and resin (i.e., geosynthetic products for environmental protection)

Precision machined components

Fabricated structural metal and metal products (i.e., interior parts for car seating, weldments for heavy industry machinery, rigid busbars for e-mobility)

Steel and other metal products

Machinery (i.e., pumps and sprayers)

Plywood

Figure 14. At Evans Tool & Die/Evans Metal Stamping, Inc., Kevin Klein loads sheet metal into a fiber laser cutting machine to fashion a part for the firearms industry. *Photograph from Evans Tool & Die/Evans Metal Stamping, Inc.*

NOTABLE MANUFACTURERS	SPECIALTIES
Evans Tool & Die	Precision metal components
Johnson & Johnson	Chemical manufacturing for pharmaceuticals
Mannington Mills	Bespoke luxury vinyl flooring
Milliken & Company	Fabrics
Parkdale Mills	Yarn & fiber

- Dee Barnes, President and CEO of Evans Tool & Die/Evans Metal Stamping, Inc., explains that as a smaller, family-owned manufacturing business, her operation is agile—turning to highly specialized products to adjust to market fluctuations. "Over the 30 years that I've been in manufacturing, overseas competition has had an impact. Although things are much better than they were probably 10 years ago, we've had to pivot into products like more highly specific and technical pieces and larger pieces that aren't easily shipped overseas, at least not at a competitive price."[3] Among Evans Tool & Die's various capabilities are tool and die, metal stamping, laser cutting, metal fabrication, design engineering, welding and finishing, machining, and other services (fig. 14).
- To showcase its custom flooring design production, Mannington Mills' factory boasts a Georgia Bulldog composed of various colored sections. Each was individually cut to form the famous canine who serves as the mascot of Georgia's flagship institution, the University of Georgia. In Greensboro, its facility also produces luxury vinyl plank flooring through the work of three granulators that operate constantly. Any excess vinyl remaining after production (i.e., small strips and shavings from cutting the planks) is recycled—strips go into a granulator to create chips that are used in the next production cycle, avoiding waste.

NORTHWEST

An Outsized Manufacturing Landscape

PRODUCTS

Specialty chemicals and chemical additives for carpet industry products and nylon fibers

Lubricants for fiber extrusion and yarn processing, wire drawing, and tire mounting, and latex binders

Plastics and lubricants for plastic

Steel and metal products (i.e., copper and other nonferrous wires and cables)

Hardwood, laminate, luxury vinyl, tile, and stone flooring

Carpets and rugs

Synthetic turf

Industrial boilers

Diesel engines

Compact tractors

Carpet finishing machinery

Solar cells

Refrigerators, ovens, and other appliances

Automotive components, systems, and parts

Lumber and wood products including doors and windows

Load securing/ transit protection products (i.e., small cell honeycomb and pneumatic air bags)

NOTABLE MANUFACTURERS	SPECIALTIES
Shaw Industries	Flooring and carpet
Toyo Tire	Toyo and Nitto brand tires
GE Appliances	Kitchen appliances (i.e., ovens, refrigerators)
Qcells	Solar cells

WHAT DO MANUFACTURERS THINK?

Patrick Lenz, President and COO at Toyo Tire North America Manufacturing, comments on the complexity of tire manufacturing. "It may seem as simple as making a round, black, rubber object, but the amount of science, technology, and engineering that goes into manufacturing tires is complex and constantly changing. The auto makers are always changing as are customers' demands. So, product evolution is critically important—and when you do that right, you're running test tires in a factory and interrupting your production to ensure the constant evolution and quality of your product. You have to transform your product to stay competitive in the marketplace."[7]

- With annual revenue exceeding $6 billion in 2023, Shaw Industries produces an enormous volume of carpet annually.[4] Shaw Industries emerged from the tufted bedspread cottage industry that boomed in the Dalton area in the 1930s and 1940s (see Insight 1). The founder of Shaw Industries, Clarence Shaw, graduated from the Georgia Institute of Technology and established a company that dyed and finished various tufted products like small rugs and bedspreads in the 1940s.[5]
- GE Appliances' Roper Corporation in Lafayette has manufactured quality cooktops and ranges (fig. 15) for over 50 years. Roper's 14 new induction cooktops have Internet capabilities to give consumers even more cooking control.[6]
- In the community of White, Toyo Tire manufactures tire brands made for the off-road enthusiast. Toyo has expanded 5 times in a fifteen-year period in the area. Seven million tires are made annually, through the work of 1,600 Toyo employees and 500 to 600 contractors in a 72-acre plant.

Figure 15. *(above)* Ovens being assembled at GE Appliance's Roper Facility in Lafayette. *Photograph from GE Appliances.*

METRO NORTH

From Contact Lenses to Specialty Belts

PRODUCTS

Paperboard, paper, pulp, and packaging products

Custom textiles

Plastic bottles, hoses, and belting

Nonmetallic mineral products

Powder coating

Machinery

Contact lenses and lens care products

Data processing

Power transmission belts

Tube and pipe bending machines

Pumps and sprayers for air and gas compression

Industrial gas

Rubber

Metal service centers, metal wholesaling, and metal finishing

Scrap metal processing, ferrous and nonferrous scrap metal recycling

NOTABLE MANUFACTURERS	SPECIALTIES
Megadyne	Specialty belts for manufacturing equipment, banking machines, and much more
Ecker Textiles	Textiles for artists and digital printing

Figure 16. Specialty belts, such as this timing belt, are manufactured by Megadyne.

- Megadyne makes a plethora of specialty belts (fig. 16) that drive manufacturing equipment and move people and products. Examples from their product line include belts you see in elevators, ATMs, and money sorting machines in banks, and vacuum belts that seal and open bags for snack foods. Even the fasteners on baby diapers are moved by these belts as they dry. About 25% of Megadyne's products are exported—mostly to Australia for the snack food industry. Megadyne has operated for thirty-five years in Georgia.
- Ecker Textiles produces canvas for painting and digital printing, among other uses. Mike Ecker, President of Ecker Textiles, talks about how the company evolved with technology. "When I started in 2002 in this part of the industry, a majority of our products were sold for the painting process or what we call the analog process of making the product. Today, 85% of our product is for digital printing which has made our process much more precise and technical, improving our legacy product [artist canvas] as well. Because of all the things we learned about how to make the canvas so precisely, the historical products have a lower reject rate and are better quality. That's been an amazing part of our transformation process."[8]

METRO SOUTH

Automating and Transporting the Industry

PRODUCTS

Material screening and processing equipment

Refrigeration equipment, refrigerated trucks, and transportation units

Heating elements for household appliances

Residential and commercial tankless water heaters

Flame-resistant textiles

Cardboard and paper products

NOTABLE MANUFACTURERS	SPECIALTIES
Grenzebach Group	Automation equipment for glass, building materials, and intralogistics markets
TenCate Protective Fabrics	Flame-resistant fabrics for firefighters, military personnel, and utility workers among others

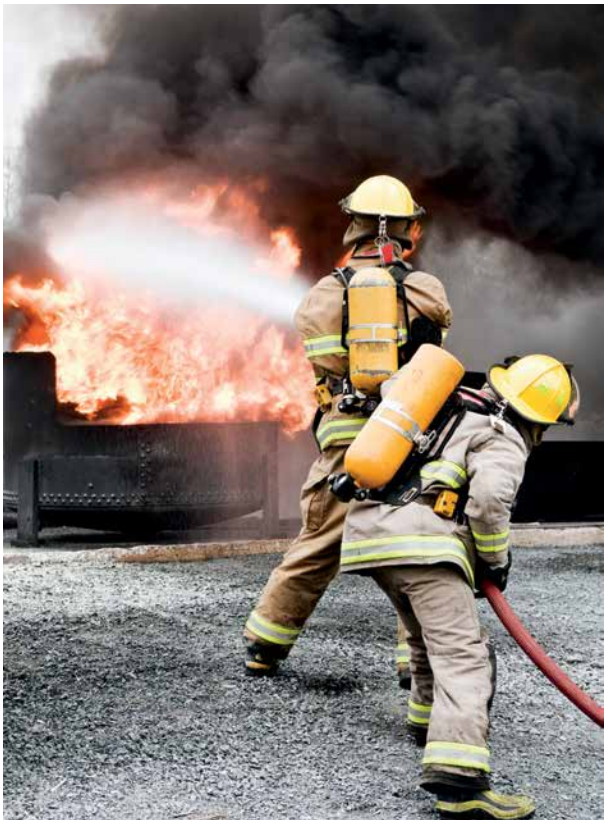


Figure 17. Tencate Protective Fabrics makes flame-resistant textiles for protective clothing.

- In Newnan, the Grenzebach Group, a mid-sized company with around 200 employees, produces automation equipment. Grenzebach President and CEO John Fluker, who is from Waycross and graduated from Massachusetts Institute of Technology with a mechanical engineering degree, explains that his company specializes in teaching customers how to automate processes by mining the client's data and identifying opportunities for efficiency improvements and equipment maintenance. For example, a carpet manufacturer may need to make a unique size for a client so Grenzebach helps the client develop a "recipe"—a multi-step process the manufacturer can enact more than once—thus, increasing efficiency.
- TenCate Protective Fabrics in Upson County manufactures inherently flame-resistant textiles (fig. 17). These fabrics provide essential safety and comfort as well. TenCate specializes in serving customers' unique situations and offering clients fabric which provides the best solution possible.

METRO WEST

Growth and Diversity

PRODUCTS

Steel products and services

Textile machinery

Awnings and canopies

Products and other enhancements for drive-thru/quick-serve restaurants and retail markets

Animal slaughtering and processing

Cardboard

NOTABLE MANUFACTURERS	SPECIALTIES
Pacesetter	Steel service center for slitting, blanking, and cut-to-length
Awnex, Inc.	Architectural metal canopies

Figure 18. Such rolled steel is modified to client specifications by Pacesetter's Service Center.

- Headquartered outside of Kennesaw, Pacesetter has a steel service center (fig. 18) in Marietta. During the 1980s and '90s the facility doubled in size, adding an additional 60,000 square feet. Pacesetter has been headquartered in the Atlanta area since 1997.[9]
- Awnex, Inc. in Ball Ground uses advanced powder coating, laser cutting, and robotic welding among other equipment to manufacture awnings, canopies, drive-thru products and other enhancements for the quick-service restaurant and retail markets. Their products are trusted by global brands like Chik-fil-A, Walgreens, Dunkin, Pizza Hut, McDonald's, Starbucks, and Chipotle.

CENTRAL

From Paperboard to Custom Hearing Protection

PRODUCTS	NOTABLE MANUFACTURERS	SPECIALTIES
Packaging solutions (cartons and containers) Tissue and paper products Hearing protection devices	EarTuff	Custom hearing protection, earmolds, and tinnitus devices primarily for use in manufacturing, military, and law enforcement
	Graphic Packaging	One of the largest producers of folding cartons in the United States[10]
	Irving Consumer Products	Soft bath tissue and high-quality paper towels

Figure 19. EarTuff provides everything Hearing Conservation and OSHA compliance across multiple industries thanks to its custom earmolds, hearing protection, and Audiometric testing. *Photograph from EarTuff.*

- In Athens, EarTuff makes custom hearing protection (fig. 19) for use in manufacturing, construction, and warehousing as well as military and law enforcement duties. Through advanced 3D scanning technology, personalized ear molds are designed by EarTuff to fit each individual perfectly so that workers obtain "maximum protection against harmful noise exposure." The company also provides OSHA standard Sound Surveys and can conduct 60 employee Annual Audiometric tests in just 1 hour.[11]
- Since 2019, Irving Consumer Products has manufactured "ultra-premium quality household paper products" at Irving Tissue in Macon, one if its state-of-the-art facilities in the United States and Canada. Both national brands and private labels are part of their product range. In November 2024, Irving announced a $600 million expansion at its Macon location which will include a third ThruAir Dry paper making machine and a new fully automated warehouse. With a fully integrated value chain, the company has its own mill supplying pulp from the 6 million acres it sustainably owns or manages.[12]

EAST

From Golf Carts to Coffee

PRODUCTS

- Kaolin clay
- Coffee
- Fertilizers and agricultural products
- Wood and paper industry equipment
- Industrial pumps
- Lead-acid batteries
- Commercial and industrial utility vehicles
- Recreational side-by-side UTVs
- Ground support equipment for aviation

NOTABLE MANUFACTURERS	SPECIALTIES
Club Car and E-Z-Go/Textron	Golf carts and utility vehicles
Starbucks	Coffee and canned beverages

- It makes sense that the home of the Masters Golf Tournament—Augusta—is also home to two of the world's leading golf cart manufacturers (fig. 20). Club Car and E-Z-Go/Textron are among the "Big 3" in golf cart manufacturing in the world.[13]
- Starbucks' Augusta Roasting Plant roasts and packages coffee for its retail locations in the eastern United States. The company makes its VIA Instant and numerous bottled and canned beverages in its first company-owned manufacturing facility in the world to produce soluble products.[14]

Figure 20. The Next-Gen Club Car Tempo golf car shown here has upgraded convenience features and performance enhancements. *Photograph from Club Car.*

WEST

Five Years of Rapid Growth and an Astounding 157 Years

PRODUCTS

- Oilseed products
- Carpets and rugs
- Tissues and personal care products
- Specialty chemicals for photography
- Textiles and textile treatments
- Water-repellant coatings
- Kaolin-based products
- Iron casting
- Batteries
- Fabrication, packaging, and distribution and fulfillment of various products

NOTABLE MANUFACTURERS	SPECIALTIES
Duracell	Battery engineering and manufacturing
International Paper	Packaging and boxes
Kimberly-Clark	Personal care products
Kodak	Commercial print and advanced materials and chemicals
West Point Industries	Foundry and tool shop

Figure 21. In 2024, Kia Georgia launched the first battery-powered EV built in the state of Georgia, EV9. *Photograph from Kia Georgia.*

- Every fifty-one seconds . . . that is how frequently a new Kia automobile rolls off the assembly line. The Korean automobile manufacturer produces five models in West Point, employing 32,000 team members and investing $2.8 billion locally (fig. 21). All models go through a test drive on Kia's 2.2-mile track before they ever leave the facility. Ameen Mohammed, a Kia Georgia Paint Engineer, feels manufacturing "gives you a sense of pride . . . that hands-on final product feel. I guess I would say that drives you more to want to improve and to make it more efficient."
- A story of resilience spanning 157 years in the area, West Point Industries, founded in 1868 was originally a textile machinery manufacturer. Having retooled in 2000 to cope with overseas competition, it is now a foundry and machine shop, selling to 75 countries.

COASTAL

Large-Scale Recycling and Even Bigger Machinery

PRODUCTS

- Aerogel products for energy, EVs, and green buildings
- Machinery for automotive, aerospace, material handling, construction, agriculture, and recycling
- Textiles
- Commercial trailers
- Power generation turbines
- Private jets
- Textiles
- Bleached board
- Copper and nonferrous wires and cables

NOTABLE MANUFACTURERS	SPECIALTIES
Mitsubishi Power Americas	Gas and steam turbine rotor service and gas turbine assembly
RYAM	Cellulose and other paper products

Figure 22. Mitsubishi Power Americas assembles gas turbines, including parts like the rotor seen here.

- RYAM is the "world's largest cellulose specialties operation, producing essential products from sustainable and renewable raw materials." In Jesup, 100% recycled fiber helps produce tissue towel and napkin products thanks to "three fiber lines manufacturing hardwood and softwood high-purity cellulose specialties, fluff pulp, and acetate products."[15]
- Mitsubishi Heavy Industries in Savannah assembles and services turbines, offering power generation and storage solutions to customers (fig. 22). The company aims for affordability and reliability that help customers combat climate change. Jim Kelleher, Vice President of Mitsubishi Power Americas, explains how his corporation is perpetually adapting to operate in the ever-evolving power industry. "Once something is accomplished, people often say, 'We did it. We succeeded.' Well, I say, 'We are already moving onto the next thing now. We're not at the pinnacle yet—just the next level.' And so, we have to keep going up and up because progress can never stop or our competitive edge might be lost. Design, fuel, and power demand are always changing. Things never stop changing in the power industry. We keep all our employees informed so that everyone is part of our on-going growth."[16]

SOUTH

One-of-a-Kind Production

PRODUCTS

Beer

Boats

Cardboard, corrugated packaging, and containerboard

Plywood and lumber

Inorganic chemicals

Soybean and cottonseed oil

Vegetable oil refining and packaging

NOTABLE MANUFACTURERS	SPECIALTIES
ADM (formerly Archer-Daniels-Midland)	Soybean, cottonseed and vegetable oil
Molson Coors Beverage Company	Coors Light, Miller Lite, Miller High Life, Henry's Hard Soda, Redd's Apple Ale, and Peroni Nastro Azzurro
Sailfish Boats	Center-console, dual console, and walkaround models

Figure 23. Center console spaciousness meets family-friendly versatility in the Sailfish 232 Center Console. *Photograph from Sailfish Boats.*

- Molson Coors Beverage Company produces a range of beers in Albany. In the summer of 2024, they added production of the Italian brew Peroni Nastro Azzurro. The Albany facility annually brews over 7 million barrels thanks to its 1.1 million square foot facility built on a former military base located on 1,700 acres of land.[17]
- In Cairo, Sailfish Boats manufactures boats for family-friendly fishing, offering multiple models of center and dual console boats as well as a walkaround. Customers can build their dream boat through selecting from an array of options—color, engine, entertainment system, lighting, battery, seating, and more. Sailfish Boats' 232 Center Console model (fig. 23) received *Boating Magazine's* 2024 Boat of the Year award in the small boat (fishing) category.

MANUFACTURERS MAKE REMARKABLE PRODUCTS

- **Industrial Classification System:** The US, Canada, and Mexico use a classification system called the North American Industrial Classification System (NAICS), which uses a series of numbers to label each type of industry and the products these industries make.
- **Manufacturing Classification Codes:** Manufacturing includes all NAICS codes beginning with the digits, 31-33. There are twenty-one manufacturing subsector codes each containing three digits, which all begin with 31, 32, or 33.
- **Broad Range of Georgia's Manufactured Goods:** Georgia manufacturers exist under ALL twenty-one 3-digit NAICS codes[18] and create a vast assortment of products.
- **Georgia's Ten Regions:** Georgia Power's Economic Development (GPEcD) Regions are comprised of the Northwest, Northeast, Metro North, Metro West, Metro South, Central, East, West, South, and Coastal.
- **Variety and Range in Production:** Georgia manufacturers create custom flooring, pharmaceutical chemicals, carpet, solar cells, industrial gas, power transmission belts, flame-resistant fabrics, tankless water heaters, steel products, awnings and canopies, paper goods, custom hearing protection, golf carts, bottled Starbucks beverages, automotive and aerospace machinery, 5 models of Kia automobiles, private jets, 100% recycled napkins, beers, boats, and more.

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INSIGHT 4

MAINTAINING MOMENTUM

GEORGIA ASSOCIATION of MANUFACTURERS

GEORGIA MUST REMAIN COMPETITIVE and avoid complacency as it competes for manufacturers, specifically within the Southeastern US. Business climate and tax provisions play a significant role in attracting, maintaining, and growing manufacturing. Georgia faces challenges in the areas of transportation, water resources, and workforce (detailed in Insight 2). Studying the headwinds facing Georgia's manufacturing sector—as well as naming strategies to steer through these challenges—will help the state prepare for the work ahead.

GEORGIA'S BUSINESS CLIMATE: BEST STATE FOR BUSINESS

In 2024, Georgia was ranked the number one state for doing business by *Area Development* magazine.[1] Georgia's business-friendly environment is partly due to our more than twenty-year-long AAA credit rating from all three major credit agencies: Fitch, Moody's, and S&P.[2]

Georgia ranks 11th in the nation for its "Economic Outlook," according to "Rich States, Poor States" (RSPS), a business climate rating system published by the American Legislative Exchange Council. This ranking is a "forward looking forecast based on the state's standing . . . in 15 important state policy variables" like property tax burden, sales tax burden, and recently legislated tax changes, etc. RSPS also ranks Georgia as 9th for its "Economic Performance," which is a backward-facing perspective of a state's performance based upon cumulative GRP growth (2012-2022), cumulative domestic migration (2013-2022), and non-farm employment growth (2012-2022).[3]

Georgia also ranks 9th among the best states for manufacturing according to Site Selection Group, based on categories such as workforce and market alignment, operating costs, and geographic positioning.[4] Five of our neighbors outrank us, including North Carolina (1st), South Carolina (2nd), Tennessee (3rd), Kentucky (5th), and Virginia (6th), with only Alabama (10th) and Florida (15th) ranking lower than Georgia in the South.[5]

Georgia continues to rank among the top ten manufacturing states in the country, according to Site Selection Group.

ATTRACTING, MAINTAINING, AND GROWING MANUFACTURING

Specific factors shape companies' decisions when choosing a city and state for establishing headquarters or investing in facilities. Government resources assist in the decision-making process. Georgia Department of Economic Development (GDEcD) serves as the state's primary marketing arm for attracting new businesses and supporting business expansions. GDEcD also administers the state's discretionary incentives when competing for prospects against other states.

The International Trade Administration (ITA) of the US Department of Commerce makes recommendations for site selection through its "Select USA" program.[6] Select USA contends that "some companies choose to build manufacturing facilities in the United States as the US-based production reduces lead time for delivering product to US customers and frees up working capital otherwise tied up in inventory."[7]

According to Select USA and *Site Selection Magazine*,[8] the following characteristics guide a corporation's site selection decision:

- local political and geographic features,
- logistics infrastructure,
- workforce,
- financial returns,
- business and tax climate,
- real estate conditions,
- utilities,
- community demographics,
- alignment with company brand, and
- sustainability.

STATES COMPETE FOR MANUFACTURING

Georgia exists within a nationally competitive environment in which states vie for manufacturers. Because the US has "fifty states, five territories, a federal district, and hundreds of diverse metropolitan areas, selecting new locations in the United States is best approached as a data-driven process."[10] The aforementioned characteristics considered for corporate site selection are mitigated by contextual factors:

WHAT DO MANUFACTURERS THINK?

Jim Kelleher, Vice President of Mitsubishi Power Americas, emphasizes an important point companies must not overlook. "We go through these cycles where in certain areas they just keep building and welcoming businesses and big tax breaks. It's critical to consider whether we have people to support the businesses. You've got to look at the whole package, the whole industry as well as what's happening in communities to decide to build or not—rather than just opening the doors wide and then realizing there is a head count problem."[9]

- Rural areas are notably important due to the longer survival rate of rural manufacturing plants over urban, indicating a likelihood for rural plants to retain manufacturing jobs;[11]
- In manufacturing, expansion is more viable than constructing new plants. Plants generally survive because of access to capital rather than state and local tax rates.

When a state's business climate is not favorable enough for a company, relocation is not out of the question. Although not manufacturing in Georgia, Lucid Motors, for example, scouted 60 markets in 13 states before the luxury electric automaker relocated to its current site in 2017.[12] Ultimately, Lucid's relocation decision boiled down to its new state's business environment, geographic location, the available talent, "proximity to utilities, an established transportation system, and strong support from state and local governments."[13] Tesla relocated to Texas in 2021 for its more favorable tax policies and regulations. Tesla has already planned a five-million-square-foot expansion.[14]

WINNING THE LOCATION DECISION: A DATA-DRIVEN PROSPECT

Jeffrey Mason, research manager at the Charter Cities Institute, told *Site Selection Magazine* just how important the business climate and regulatory environment can be for multinational corporations looking for investment locations among a plethora of options.

"A city must offer some advantage that makes it more attractive than competitors. One area in which cities can compete for investment—that does not require substantial physical investment like infrastructure—is the regulatory environment. Easy business setup, regulatory compliance, interfacing with government, dispute resolution, and paying taxes can make an investment destination particularly attractive, even if alternatives could potentially offer slightly lower costs or slightly better infrastructure. A city where interactions between the investor and the government are quick, painless, and low-cost will be very attractive to a wide variety of domestic and international investors."[15]

GEORGIA'S ECONOMIC DEVELOPMENT TOOLS ATTRACT AND RETAIN MANUFACTURING

Georgia is 12th nationally in Corporate Tax Rank, according to the 2025 State Tax Competitiveness Index published by the Tax Foundation. Although Georgia's overall Index ranking is 26th, that represents an improvement of 6 places since 2024.[16] The state is set to become even more tax competitive. By 2028, both Georgia's corporate and individual income tax rates are set to decrease to 4.99% (Table 4).

Within the Southeast, Georgia was first to assume single sales factor apportionment, meaning corporate tax is calculated based only on the sales the corporation makes inside Georgia. This method allows companies to increase their infrastructure investment in Georgia (property, plant, and payroll) without impacting Georgia income tax liability.[17]

Although tax incentives are not the only factor influencing businesses, "up to 25 percent of companies that relocate, expand, or remain in a certain location are influenced by tax incentive policies."[18]

COMPETITION IN THE REGIONAL LANDSCAPE: CONTEXTUALIZING GEORGIA'S BUSINESS CLIMATE

Tax credits in the areas of jobs, investments, retraining, and research and development exist in Georgia, as well as several grants (Table 4).[19] Manufacturers often consider multiple states in the Southeast when expanding or relocating, due to similar costs of living, tax rates, workforce availability, proximity to major markets, and other sector-specific factors. But how similar is Georgia to its neighbors and how do its tax credits and exemptions affect its competitiveness? The incentives and tax rates most relevant to manufacturers are summarized in Table 4. Over the years, GAM has served industry as a leading voice in improving the competitiveness of the state's tax environment. GAM contributed to achieving single factor apportionment, led the charge to eliminate the sales tax on energy used in manufacturing as well as advocating for the adoption of key exemptions on certain business inputs.

Georgia competes with neighboring states (defined in this analysis as South Carolina, North Carolina, Tennessee, and Alabama) that also offer deal-closing grants, though criteria and values vary. Deal-closing grants attract large projects requiring over $50-100 million in investment and 100+ jobs. These grants are awarded based on the "but for" principle, meaning a company would not locate within a state without the grant. These grants are highly desirable as they offset construction and infrastructure costs for new businesses.

Table 4. Southeast Economic Development Incentives and Tax Rates.

Program Type	Georgia	South Carolina	North Carolina	Tennessee	Alabama
Investment Tax Credit	1% - 8% of equipment spend, minimum $100,000 investment	One-time, up to 2.5% of a company's investment in new production equipment	N/A (Repealed)	N/A	Up to 1.5% credit annually of eligible capital investment for up to 10 years, based on payroll and capital investment
Research & Development Tax Credit	10% of the taxpayer's qualified R&D expenditure over the base amount; excess credit may be immediately applied against payroll withholding	5% of the taxpayer's qualified research expenses	N/A	N/A	N/A
Sales and Use Tax Exemptions	Machinery used in manufacturing is exempt from sales and use tax; no tax on inventory	Machinery used in manufacturing is exempt from sales and use tax	Machinery used in manufacturing is exempt from sales and use tax	Machinery used in manufacturing is exempt from sales and use tax	Reduced rate of 1.5% for machinery used in manufacturing
Job Tax Credit	Credit of $1,250 to $5,000 annually for every new job created for 5 years; excess credit may be immediately applied against payroll withholding	Credit of up to $3,250 per employee per year for new companies	N/A (Repealed)	Credit of up to $4,500/employee to offset franchise and excise taxes	Cash refund of up to 3% of the previous year's annual wages for eligible employees againstutility taxes for up to 10 years
State Training Incentives	Retraining: up to $500 per employee per approved retraining program, capped at $1,250 per employee per year	Retraining: up to $1,000 per employee per year for retraining costs	N/A	FastTrack job training assistance offsets costs of training employees in new and expanding companies	Alabama Industrial Development Training provides free industrial training
Port Tax Credit	Income tax credit for increase in port volume by more than 10%; minimum 75 net tons, 5 containers, or 10 TEUs	Income tax credit OR withholding tax credit for minimum 5% increase in port volume; minimum 75 net tons	N/A (Repealed)	N/A	Income tax credit for increase in port volume; minimum 75 net tons
State Corporate Income Tax (2025)	5.19%*	5%	2.25%	6.5%	6.5%
State Personal Income Tax (2025)	5.19%*	6.2%**	4.25%	N/A	5%**
Deal Closing Grants (large projects)	OneGeorgia EDGE Fund Program, grant of up to $500,000 Regional Economic Business Assistance (REBA), grant of up to $750,000	SC Governor's Closing Fund awards grants up to $10,000 per job	Job Development Investment Grant awards cash up to $16,000 per job	FastTrack Economic Program and FastTrack Infrastructure Program awarded an average of $6,746 per job in 2022	Industrial Development Grant awards up to $150,000 for site preparation, based on capital investment
Manufacturing-Specific Incentives	Mega Project Tax Credit: $5,250 per job annually for up to 5 years for qualifying large-scale projects creating at least 1,800 jobs, minimum investment of $450 million	Corporate income tax moratorium for certain investments in economically distressed counties	Industrial shell building loans with 2% interest for up to 5 years	Income tax credit of up to 1% for purchase of manufacturing machinery	Capital investment Tax Credit: 5% of initial capital costs for large projects against income taxes for up to 20 years

*Georgia's individual and corporate income tax rates are set to decrease to 4.99% by 2028.[20]
**The percentage relates to the top bracket of income tax rates in the respective state.

Table 5. Average Effective Tax Rate for Commercial Properties in the Southeast.

State	Assessment Ratio	Average Millage Rate	Effective Tax Rate
South Carolina	6%	300 mills (0.300)	1.80%
North Carolina	100%	100 mills (0.100)	1.00%
Alabama	20%	50 mills (0.050)	1.00%
Tennessee	40%	25 mills (0.025)	1.00%
Georgia	40%	30 mills (0.030)	1.20%

These states differ in the other major incentive categories as well, reflecting variations in state tax strategies and priorities:

- **Investment Tax Credits:** This incentive is not available in Tennessee or North Carolina.
- **R&D Tax Credits:** These credits are available only in Georgia and South Carolina, supporting innovation.
- **Sales and Use Tax Exemption:** Four out of 5 states (all but Alabama) exempt sales taxes on machinery used in manufacturing. Georgia offers the broadest sales tax exemption for manufacturers.
- **Job Tax Credit and Training Incentives:** Unlike its peers, North Carolina lacks a job tax credit and a state workforce training program.
- **Port Tax Credits:** These credits are offered by four states, but not North Carolina, and benefit import/export businesses.

While incentives help attract businesses, states with lower tax rates can rely less on them. Georgia remains competitive by balancing tax rates and incentives, ensuring it can attract investment without over-reliance on business grants.

Table 5 displays average effective tax rates for commercial properties for several Southeastern states. A Millage Rate—a "numerical multiplier" attached to the value of a property— is used to calculate local property taxes. Some of the reported rates take abatements into account or do not use averages or adjustments for rural areas. Only South Carolina has higher real property tax rates than Georgia, whose rates are slightly above North Carolina, Alabama, and Tennessee.

Ultimately, policy decisions that affect the business climate require a measured approach. Dr. Roger Tutterow, Professor of Economics at Kennesaw State, contends:

> "The competition from other states is tricky because when it comes to tax credits, we don't want to get into a bidding war in which each state ends up undercutting the other. At the end of the day, all the competing states have done was lower their tax revenues and not really changed the location of the business that much. We want to use taxes to help reward businesses that create lots of spillover effects—which manufacturing does. If we think about multiplier effects, that is, for every dollar of direct activity in the company, how much is stimulated in activity throughout the rest of the economy. Typically, manufacturing is at the top of the heap in terms of the size of their multipliers."[21]

NAVIGATING HEADWINDS IN TRANSPORTATION, WATER, AND WORKFORCE

Manufacturing is facing critical issues requiring substantial solutions, particularly transportation infrastructure, water resources, and the need for workers.

Transportation and workforce issues overlap in the state, as evidenced by the truck driver shortage. Water is particularly critical due to its finite supply and outsized demand; it provides vital support for both manufacturing and the booming population drawn to manufacturing hubs. Solutions exist to navigate the headwinds facing Georgia's transportation, water, and workforce and include strategic investments.

Georgia Department of Transportation (GDOT) projects received $1.5 billion in 2024 to support general aviation airports, local roads, freight-carrying infrastructure, as well as capital construction and maintenance. Governor Kemp aims for these projects "to ensure our already reliable infrastructure network can meet the needs of . . . [Georgia's] incredible growth" (fig. 24).[22]

CARRYING THE LOAD: TRUCKS ON GEORGIA'S HIGHWAYS

It is forecasted that from 2019 to 2050, trucks will carry 87% of the new tonnage emerging in the state.[23] Trucks account for 15% of travel on Georgia's interstate highways.[24] According to TRIP, a national transportation nonprofit, Georgia's freight system moved 629 million tons of freight worth $986 billion in 2022, representing the 10th largest value of freight tonnage moved in the country. An increase of 67% of truck freight tonnage moved annually and 96% in inflation-adjusted dollars is expected from 2022 to 2050 in Georgia—the 18th highest increase in the nation.[25]

Georgia's highway freight system is already challenged, and the problems will worsen with the forecasted freight volume increases. Existing persistent issues must be addressed: bottlenecks and their associated shipping costs increases, and truck parking shortages.

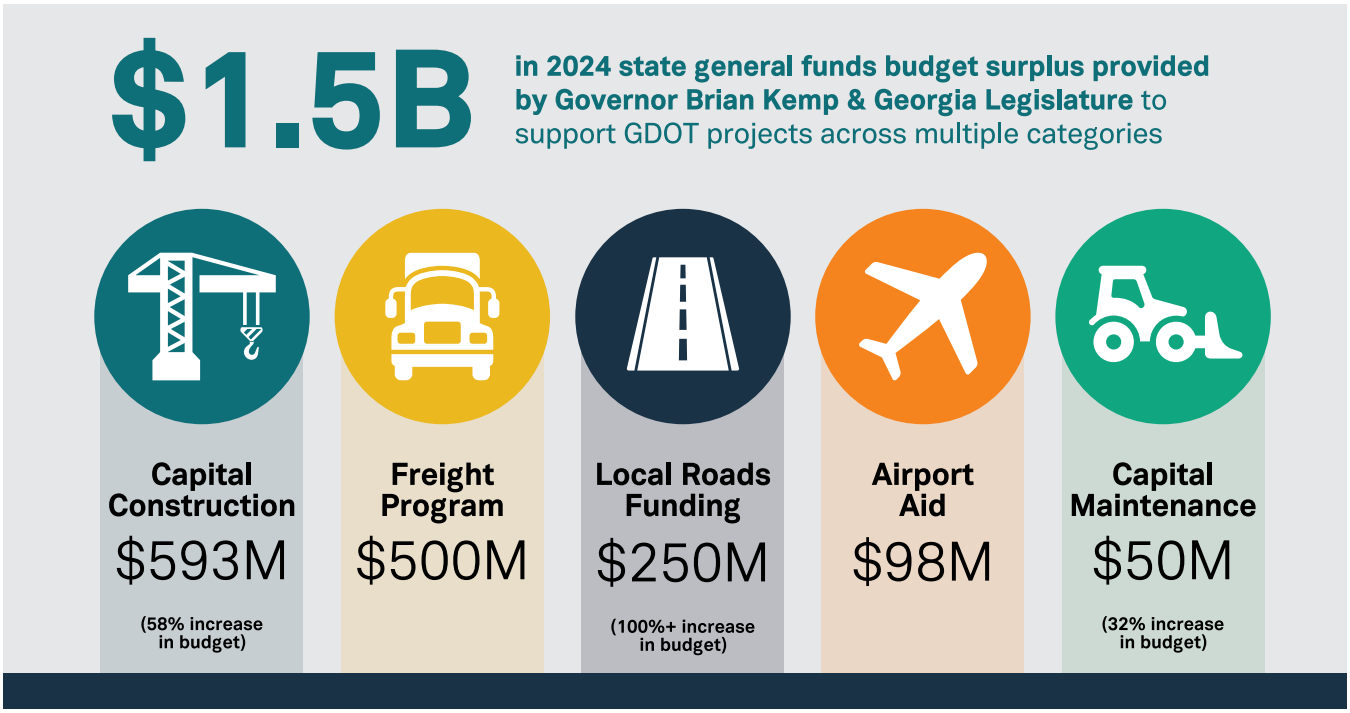
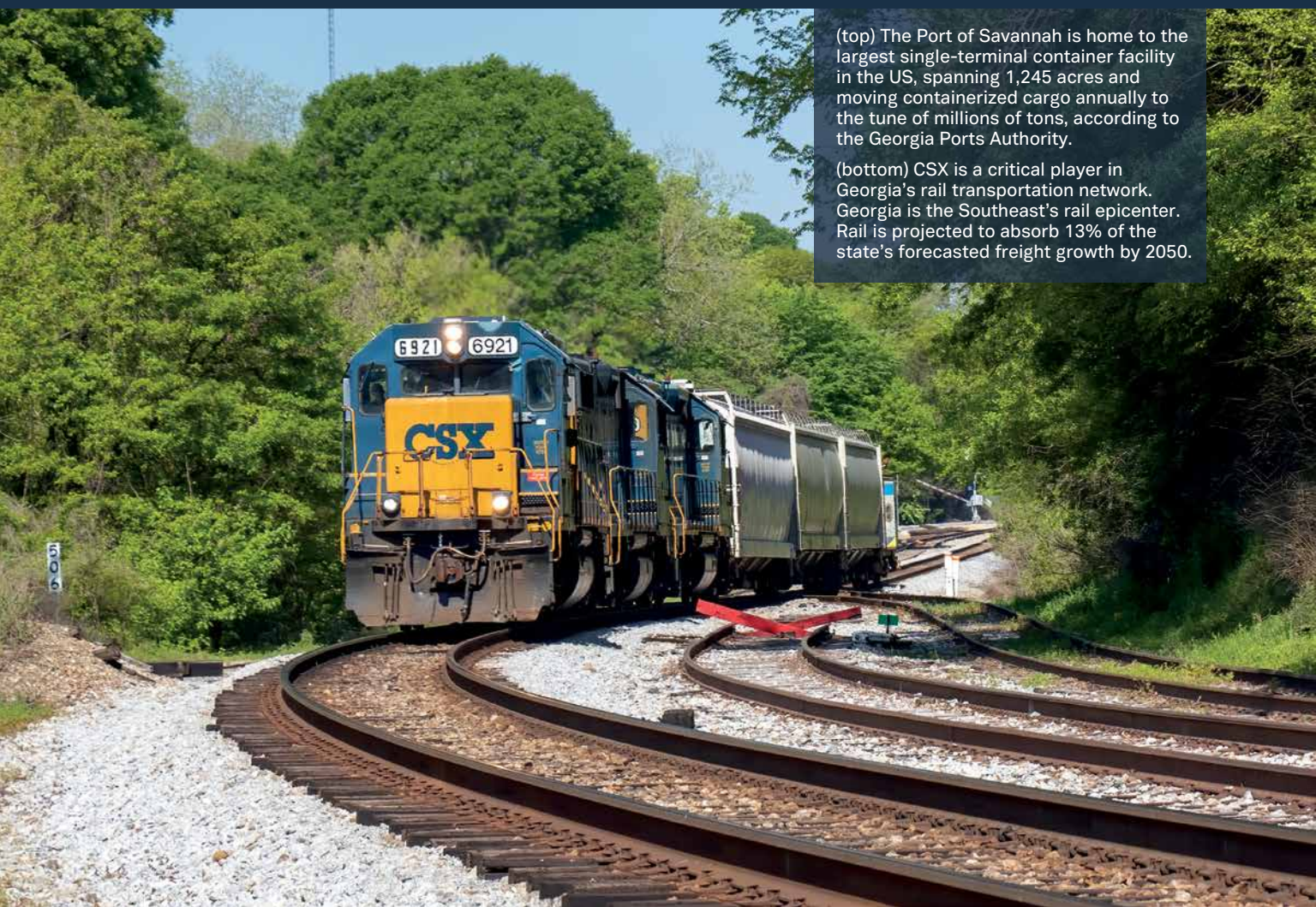


Figure 24. Georgia's transportation investment in 2024.
Infographic adapted from Georgia.org.



(top) The Port of Savannah is home to the largest single-terminal container facility in the US, spanning 1,245 acres and moving containerized cargo annually to the tune of millions of tons, according to the Georgia Ports Authority.

(bottom) CSX is a critical player in Georgia's rail transportation network. Georgia is the Southeast's rail epicenter. Rail is projected to absorb 13% of the state's forecasted freight growth by 2050.

In Georgia, there is only 1 parking space available for every 11 trucks.[26] A truck parking shortage negatively impacts the economy and supply chains.[27] When there are limited parking spaces, it takes longer to park which causes truckers' wages to be reduced—resulting in an annual pay reduction of 12%, approximately.[28] To improve the truck parking shortage, GDOT must repurpose and "expand existing facilities," "build new facilities," "designat[e] emergency facilities," use truck parking technologies to direct drivers to available spaces and routes favorable for parking, and expand public-private partnerships to construct truck parking.[29]

Echoes of workforce challenges (discussed in Insight 2) are evident in truck parking shortages. Fortunately, solutions are underway or, at a minimum, under investigation by the State. According to the American Transportation Research Institute's 2023 report, Georgia has "2 of the top 5 bottlenecks"—concentrations of congestion—and "5 of the top 20 overall worst congestion points in the nation,"[30] which create $4.4 million in daily user costs for trucking and shipping companies.[31] With at least 85% truck traffic growth in urban Atlanta bottlenecks expected by 2050, this issue will not resolve itself.[32] To address congestion, GDOT makes use of a Major Mobility Investment Program[33] and the Governor's Road Improvement Program (GRIP) to expand roadways.[34] Legislation is being considered to allow trucks to haul heavier loads for all commodities in the state. Passage of such legislation could decrease the volume of truck traffic on roadways.

GEORGIA'S PORTS: EXPANDING TO ACCOMMODATE GROWTH

The Port of Savannah (POS), the 4th largest container port in the country, is operated by the Georgia Ports Authority (GPA).[35] It ranks 2nd in the nation for port connectivity according to the United Nations Committee for Trade and Development (UNCTAD). Port connectivity refers to how well a port is connected to global shipping networks, essentially indicating how easily goods can be transported to and from that port considering 5 factors, such as the number of companies providing direct services and the size of the largest container ship.[36]

Three primary POS issues exist: a) port delays, b) the height of the Talmadge Bridge, and c) the need to expand the port's reach across its network of inland ports and beyond. With the elevated congestion in the POS and the increased volume of containers—which are shipped at a growth rate exceeding that of even Los Angeles—Savannah's average delay times were the highest of any large container ports in the country as of 2022.[37] GDOT is currently researching options for addressing the air draft challenges of the Savannah River's Talmadge Bridge, which cannot accommodate the height of super-sized freighters.[38]

The GPA operates 4 inland ports and 3 sea terminals in Savannah, Brunswick, and Garden City, all of which are slated to expand within 3 to 10 years. Savannah's completed Mason Mega rail project enables CSX and Norfolk Southern to access cities as far away as Chicago. The Mason Mega rail and inland ports enable fluid road traffic and expanded service by the port to farther locations, which lets the POS take overflow from ports unable to handle such traffic.[39] The Colonel's Island Auto Terminal, at the Port of Brunswick, is number 1 in the nation for new auto imports. The terminal's expansion and harbor widening and deepening will be completed in 2026, enabling the terminal to become the nation's top port for roll-on, roll-off cargo.[40]

RAIL AND INLAND PORT NETWORK: POSSIBLE SHIFTS FOR MANUFACTURING

Georgia is the Southeast's rail epicenter, with connections from the POS to Atlanta, Birmingham, Charlotte, Memphis, Orlando, Los Angeles, Seattle, New Jersey, and Chicago, among others. The state's rail system includes two Class I railroads, Norfolk Southern and CSX, and 28 short line railroads for "last mile" service (the last part of a delivery process where a train delivers goods directly to a customer's location).[41] Georgia's inland ports include:

- Appalachian Regional Port (ARP) in the Northwest, strategically located near Georgia's carpet and flooring industry hub, supporting access to inland markets beyond Georgia;
- Cordele Inland Port in the West, also supporting rail access to inland markets beyond Georgia;[42]
- Bainbridge Terminal in the South along the Apalachicola-Chattahoochee-Flint Waterway or Tri-Rivers System; and
- Blue Ridge Connector, which is under construction in the Northeast.

These inland ports serve as a "rail or barge terminal link" to ocean ports through inland transportation services like trucking, river barge, and rail.[43]

Manufacturing and automotive are among the top growth industries compatible with rail transportation, which may herald a shift toward rail for these industries.[44]

Although intermodal (container) shipments by rail are slower than highway transport, rail has several benefits:

- **Capacity:** Railways are capable of moving "seventeen times [more tons per route mile] the freight volume of the average mile of roadway."[45]
- **Fuel-Efficiency and Sustainability:** Rail travel is the most fuel-efficient way to move goods over land, contributing only 2.0% to total US greenhouse gas emissions, according to the 2024 annual EPA report.[46]
- **Cost Savings:** An average of 23% in industry shipping costs savings are attributed to Georgia's rail system as compared to roadway. The cost is half that of highway shipping.[47]
- **Labor Shortage and Highway Congestion Relief:** According to the GDOT, "one intermodal train shipment can replace as many as 200 trucks."[48]

Figure 25 details the challenges and solutions for Georgia's rail and inland port network. Georgia's manufacturing and agriculture sectors have faced inconsistent access to rail and relied more heavily on trucking; however, GDOT predicts that an "adoption of intermodal growth is likely to accelerate by 2025."[49]

The GDOT's Rail Service and Investment Program includes a variety of short and long-range projects, with a total estimated cost of approximately $2.3 billion.[50] Their goal is to "increase rail's modal share," "modernize the short line railroad infrastructure," "extend the reach of the POS through inland ports," and "alleviate blocked crossings."[51] With Georgia-based freight forecasted to nearly double by 2050, rail will absorb 13% and trucking 86% of the increase if the current state of these systems remains unaltered.[52]

AIR: ENHANCING GEORGIA'S GLOBAL VISION IN ATLANTA

Hartsfield-Jackson Atlanta International Airport (IATA code ATL) is Georgia's primary location for air cargo operations. It is home to integrated air cargo carriers handling domestic freight, namely UPS, FedEx and Amazon, with additional sites for UPS, the largest tenant at Albany's Southwest Georgia Regional Airport[53] and for FedEx, the operator of an air cargo facility at Savannah/Hilton Head International Airport.

Air transportation in Atlanta faces challenges: a) highway congestion hindering domestic freight transportation, b) a need for improved road conditions, and c) insufficient share of the freighter service market that ships global cargo. Domestic freight technology is exploring unmanned aerial vehicles (UAVs, or drones) to transport domestic freight, recognized by GDOT as a trend to be watched closely.[54]

Delta handles overseas freight at ATL, carrying cargo to international destinations that has been trucked in via the Road Feeder Service (RFS). RFS pulls primarily from outside Atlanta, so it is hindered by the aforementioned highway bottlenecks. The need for improved road conditions for RFS routes is paramount.

To achieve Georgia's vision as a global cargo hub, the Atlanta Department of Aviation must develop a freighter service composed of "dedicated cargo aircraft . . . that fly over seas and bring a substantial boost to capacity." Southeast freighter service is now dominated by Miami, which "imported by freighter nine times the air cargo volume as ATL" in 2020, according to FAA data reported by the GDOT.[55]

GEORGIA'S WATER RESOURCES

Georgia boasts more than 70,000 miles of rivers and streams, 425,382 acres of public lakes and reservoirs, 4.5 million acres of freshwater wetlands, 854 square miles of estuaries, and 100 miles of coastline. The Chattahoochee River is the most heavily used among our water resources, which supply our population with water for drinking, irrigation, animals, recreation, and manufacturing.[56] These resources are under strain from recent droughts and salination.[57]

Increased demand being placed on a finite supply, as well as safety hazards due to contamination compound Georgia's water challenges. Notable demand comes from the Atlanta area[58] and the southern coastal region surrounding Savannah.[59] Along the Georgia coast, Savannah Mayor Van Johnson has called Savannah's water supply "the bane of our existence."[60]

WORKFORCE SHORTAGES

Georgia's manufacturing industry saw a 56% turnover rate in 2023. Put another way, of the 424,205 Georgia manufacturing jobs available, 238,421 could not easily remain filled.[64] At the 2024 GAM Fall Meeting, Dr. Roger Tutterow, Professor of Economics at Kennesaw State, explained that as the economy reopened after

Figure 25. Georgia's rail and inland port network challenges and solutions.

the pandemic, there were 2 unfilled jobs for every 1 available worker nationally, equating to 12 million unfilled jobs. More recently, in Q4 2024, around 1.1 jobs were available for every 1 worker in the country, representing 7.5 million open jobs—an improvement over the post pandemic number.

In 2025, the US is getting back toward something resembling 1 unfilled job for each available worker for the first time in 5 years. Tutterow cautions that the national labor force participation rate is still below pre-pandemic levels—with nearly 2 million workers absent. GAM, the State of Georgia, and the Smart Factory Institute offer innovative solutions to support manufacturers in addressing the state's workforce needs.

Taking the lead to address these workforce challenges within recent years, GAM has:

- conducted a workforce needs survey for its membership and published the survey's results,
- initiated workforce development pilot programs,
- published a Fair-Chance Hiring Guide in partnership with Honest Jobs, the nation's largest online marketplace for fair-chance jobs for justice-involved individuals, and
- invested in the development of *Manufacturing Georgia*, a social media platform, which will connect prospective manufacturing workers with manufacturing companies and promote the modern image of the industry; this is the first platform of its kind in Georgia.

MANUFACTURING GEORGIA: CONNECTING MANUFACTURERS WITH FUTURE WORKERS

In early 2025, GAM announced "*Manufacturing Georgia*"—the first-ever digital platform designed to help Georgia manufacturers engage directly with the public. The innovative Manufacturing Georgia platform features dynamic, social media and gaming capabilities to connect manufacturers with future workers, especially younger audiences. The goals driving the platform's development are twofold: 1) improving public awareness and understanding of modern manufacturing, and 2) increasing the pool of skilled manufacturing workers within the next five years.

The *Manufacturing Georgia* platform highlights the diverse ecosystem of manufacturing careers and enables manufacturers to communicate directly with students and the public. Features include real-time job postings, such as youth apprenticeships and work-based learning opportunities, as well as training programs and insights into the modern age of manufacturing.

MANUFACTURING GEORGIA
MAKE YOUR WAY

Facing these headwinds requires manufacturing to collaborate with the State and GAM to investigate the issues, plan and initiate solutions, and assess the efficacy of these remedies. Just as manufacturers use a data-driven decision-making process in their choice to relocate to or expand in Georgia, stakeholders will be served by allowing data to inform the solutions we pursue for our workforce challenges.

Stakeholder cooperation is vital to support workforce training, which will generate a massive return on investment for the state. With an eye toward the future, Insight 5 addresses what is possible for Georgia manufacturing in the coming years.

(opposite) From 2017 to 2022, Georgia's manufacturing industry experienced growth of 4% and expects an additional growth of 11% through 2027, according to GAM's 2023 Georgia Manufacturing Workforce Needs Report.

(this page) In Atlanta's I-285 and I-85 section, traffic crawls, leading to daytime truck speeds below 20 mph and an average overall speed of 35 mph, according to the American Transportation Research Institute's 2025 Top Truck Bottleneck List. Unlocking traffic bottlenecks is among the state's transportation priorities.

REMAINING COMPETITIVE

- **Georgia's Industry Status Nationally:** Various organizations gather data to determine state industry rankings, influencing a state's business climate reputation. Georgia's current rankings include:
    - #1 State for doing business for the eleventh consecutive year[65]
    - 9th: Best state for manufacturing[66]
    - 9th: Economic Performance Rank
    - 11th: Economic Outlook Rank[67]
    - 12th: Corporate Tax Rank
    - 26th: Overall Tax Competitiveness Index ranking[68]
- **Site Selection Features:** Logistics infrastructure, workforce, financial returns, business and tax climate, real estate conditions, utilities, community demographics, alignment with company brand, and sustainability guide a corporation's site selection decision.[69]
- **Expansion's Benefits:** In manufacturing, expansion is more viable than constructing new plants.
- **Capital Over Tax Rates:** Plants generally survive because of access to capital rather than state and local tax rates.[70]
- **Longevity in Rural Survival:** Rural areas are notably important due to the longer survival rate of rural manufacturing plants over urban, indicating a likelihood for rural plants to retain manufacturing jobs.[71]
- **Economic Development Incentives:** Georgia's incentives reflect variations in state tax strategy and priorities.
- **Transportation Challenges:** Georgia's highway freight system has bottlenecks and truck parking shortages. Our rail and inland port network confront network access, share, connectivity, and capacity troubles, along with blocked railroad crossings, and a demand for a more extended reach for the Port of Savannah. The Port is contending with three primary issues: port delays, the Talmadge Bridge's height, and the need to expand the port's reach across its network of inland ports and beyond.
- **Headwinds in Air Transportation:** Air transportation is encountering congestion hindering domestic freight transportation on roadways leading to Hartsfield Jackson Atlanta International Airport, a need for improved road conditions to reach air transport, and insufficient market share of global cargo freighter shipping.
- **Water Woes:** Georgia's water struggles include an increasing demand being placed on a finite supply.
- **Work Force Involvement:** America's labor force participation rate is still below pre-pandemic levels.

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INSIGHT 5

MOVING AHEAD

GEORGIA ASSOCIATION of MANUFACTURERS

AS DISCUSSED IN INSIGHT 2, Georgia's manufacturing-derived GRP growth has been fueled by food, chemicals, aerospace, paper, and machinery. Food is also the largest manufacturing employer, followed by fabricated metals, machinery, plastics and rubber, and textiles. These subsectors have flourished in Georgia for decades; they have the ability to endure.

Yet as Georgia manufacturing transforms, data show that new subsectors have the potential to emerge. PitchBook, a leading research firm analyzing trends and investment, has identified 92 "Emerging Spaces" in Georgia as of Q4 2024—30 of which are tied directly to manufacturing.

LEVERAGING EXISTING STRENGTHS TO CREATE NEW OPPORTUNITIES

Emerging Spaces are early-stage investment subsectors likely to gain traction through shifts in regulation, cultural changes, the rise of complementary technologies, or other externalities, according to PitchBook. The spaces they identify are chosen based on three primary criteria:

- *recency* (how newly the sector has emerged),
- *adoption* (whether products or services have achieved widespread use), and
- *outlook* (the likelihood of increased funding).[1]

The top 12 Emerging Spaces—as measured by number of companies investing—are identified in Table 6. Each of these Emerging Spaces represents opportunities for Georgia to further innovate and diversify its manufacturing economy by drawing on existing strengths. Notably, subsectors like modular construction, counter-unmanned aerial systems, and sports tech are gaining ground, while others like indoor farming and electric vehicle (EV) infrastructure reflect new directions in manufacturing. In short, these Emerging Spaces represent a blend of subsectors aligned with Georgia's existing strengths and new, transformative industries.

In 2022, Bowery Farming, the largest US vertical farming company, launched a smart indoor farm in Henry County, growing greens and lettuces for over 800 US retailers.

Table 6. Emerging Spaces Related to Manufacturing in the State of Georgia Ranked by Capital Invested (Q4 2024).[2]

Emerging Space	Capital Invested	Company Count	Aligns with Existing Strengths	Notes
Indoor Farming	$29.77B	30	New	A potential disruptor in agriculture and food systems
Sports Tech	$14.30B	42	New	Represents innovation in wearables and human performance
Sustainable Packaging	$14.07B	14	Yes	Complements existing paper manufacturing subsector
Cannabis Beverages	$2.00B	17	New	Tied to shifts in consumer goods and regulation
Electric Vehicle Charging Infrastructure	$1.67B	14	Yes	Supports automotive and electrical equipment manufacturing
Small Satellites	$1.09B	21	Yes	Expansion of Georgia's aerospace capabilities
Fertility Tech	$600.13M	11	New	Biomedical and precision manufacturing potential
Sleep Tech	$107.40M	15	New	Health tech integration into manufacturing
Counter-Unmanned Aerial Systems	$55.29M	62	Yes	Supports aerospace and defense clusters
Data Center Cooling Tech	$52.99M	12	New	Growth area in support of digital infrastructure
Modular Construction	$42.08M	82	Yes	Aligns with machinery and fabricated metal product manufacturing
Connected Fitness Equipment	$30.74M	13	New	Innovation within consumer electronics and health markets

EMPLOYMENT GROWTH

Georgia's manufacturing future can also be glimpsed through the Georgia Department of Labor's Long-Term Industry Outlook. Compiled every other year, the current outlook covers 2022 through 2032.[3] Sorting by projected annual growth rate, the top ten manufacturing subsectors correlated well with those revealed by PitchBook. Table 7 shows these subsectors are expected to grow in Georgia in terms of overall employment.

The statistics below are drawn from a broad repository of public information. Combining these projections with those of PitchBook's privately sourced projections increases the accuracy of the overall forecast. As seen in PitchBook, the subsectors expected to grow are among Georgia's core manufacturing strengths: chemical, automotive, fabricated metal, machinery, and rubber, as highlighted in Table 7.

Table 7. Expected Growth Rate of the Top Ten Manufacturing Subsectors (2022-2032).*

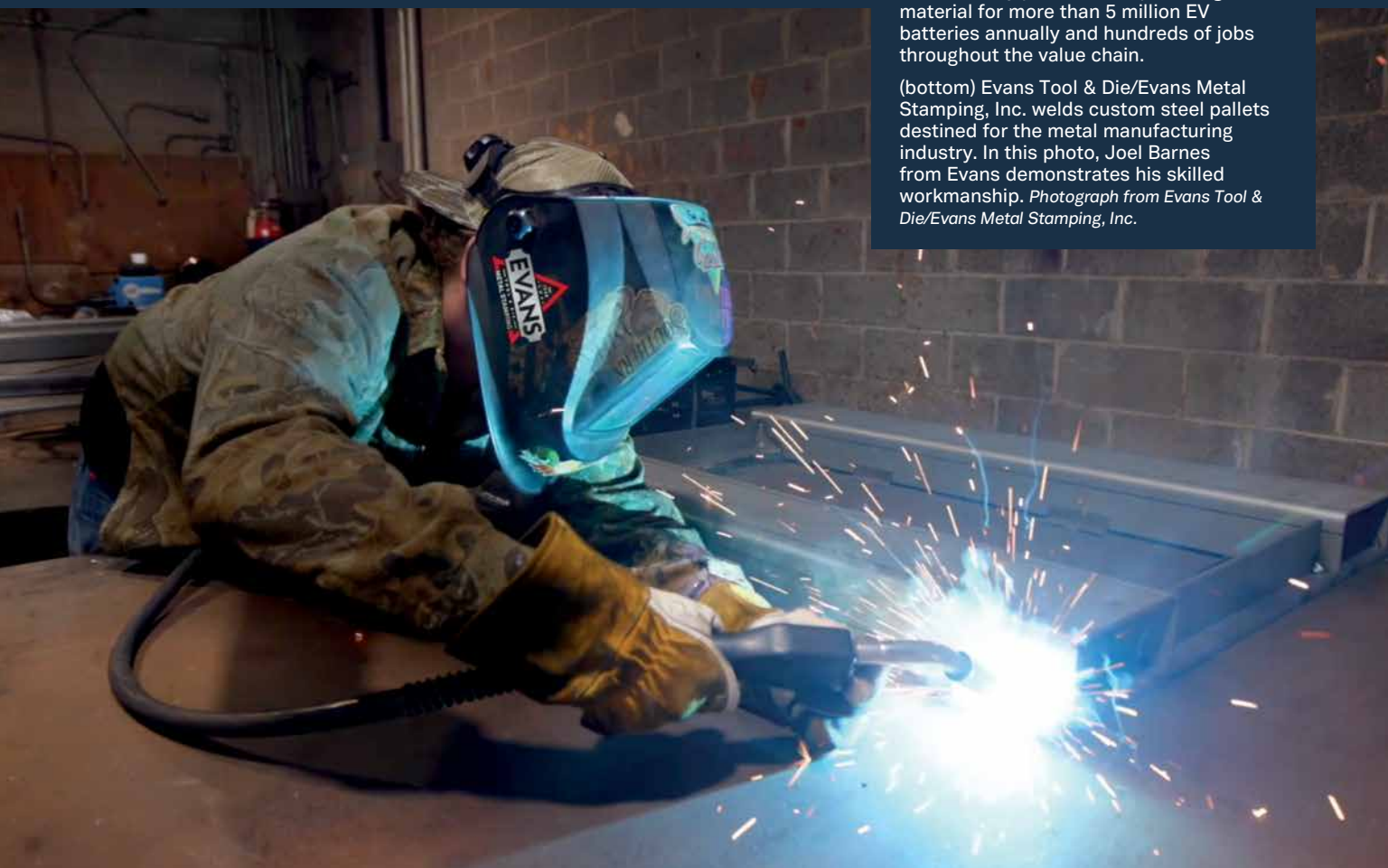
Manufacturing Subsector	Georgia Employment in 2022	Projected Georgia Employment in 2032	Change in Employment	Annual Growth Rate
Other Electrical Equipment, Appliances and Component	6,150	8,280	34.6%	3.0%
Pharmaceutical and Medicine	3,500	4,170	19.0%	1.8%
Chemical	12,650	14,760	16.7%	1.6%
Automotive**	27,500	33,220	20.8%	2.08%
Rubber Product	6,460	7,600	17.7%	1.6%
Furniture and Related Product	9,320	10,960	17.7%	1.6%
Fabricated Metal Product	26,040	30,280	16.3%	1.5%
Machinery	21,170	24,480	15.6%	1.5%

*The Georgia Labor Market Explorer uses data compiled from multiple sources, including the US Census, Georgia Department of Labor, US Bureau of Economic Analysis, and the US Department of Labor, Bureau of Labor Statistics.[4]

**Multiple subsectors compose Automotive: Motor Vehicle Body and Trailer, Motor Vehicle Parts, and Motor Vehicle. Motor Vehicle production relates to the entire assembled product, while Motor Vehicle Body and Trailer involves producing the physical structures and trailers for vehicles; and Motor Vehicle Parts includes manufacturing individual components like engines, brakes, and seats.[5]

(top) Georgia's chemical manufacturers are key suppliers for the state's manufacturing industry due to companies like Augusta's Solvay facility producing a battery-grade thermoplastic fluoropolymer, PVDF, critical to EV battery production—providing material for more than 5 million EV batteries annually and hundreds of jobs throughout the value chain.

(bottom) Evans Tool & Die/Evans Metal Stamping, Inc. welds custom steel pallets destined for the metal manufacturing industry. In this photo, Joel Barnes from Evans demonstrates his skilled workmanship. *Photograph from Evans Tool & Die/Evans Metal Stamping, Inc.*



Georgia's metal manufacturers supply the state's automotive, aerospace, energy, and construction equipment industries.

MANUFACTURING RANKS AMONG TOP POTENTIAL GROWTH INDUSTRIES

Examining regional trends (Table 8) offers even more insight into what to expect for Georgia manufacturing in the future. The Georgia Labor Market Explorer showed that eight different subsectors of manufacturing are among the industries projected as the top twenty fastest growing local workforce development areas (LWDA) in Georgia between 2020 and 2030 (Table 8). Manufacturing jobs in the state are expected to grow 8% by 2028.

A few LWDAs—Coastal Region, Cobb County, City of Atlanta, and Atlanta Regional—had only non-manufacturing subsectors in the top twenty growth industries. These regions are densely populated except for the Coastal Region.

Because manufacturers often locate in less populated areas where land is cheaper and traffic congestion less, rural areas are strongly represented among the top twenty, with three or more manufacturing subsectors in the following regions: Altamaha (Heart of Georgia), Northwest, Middle Flint, West Central (Three Rivers), East Central, and Southwest. Once again, we see how manufacturing is crucial to the economy of rural areas, as it comprises a larger percentage of industry in those regions.

Of course, other insights can be drawn from projections in different regions, such as:

- Wood product manufacturing is concentrated in areas with large supplies of timber, likely due to efforts to minimize shipping costs for raw materials;
- In contrast, food manufacturing, transportation equipment, and fabricated metal products growth is predicted to spread across the state, showing no regional bias.

Short-term projections by region (compiled using data from Georgia Power) support the long-range regional trends predicted. The top 3 manufacturing subsectors by percentage growth predicted between 2024 and 2027 are shown in Table 9. As in long-range trends, food, transportation equipment, fabricated metal, machinery, and wood products are poised for short-term growth in multiple regions, albeit with some differences in the regions predicted to grow for each subsector.

One subsector that will grow appreciably in the short-term in 5 regions is not represented in long-term growth: electrical equipment, appliances, and components; this may be attributed to several factors:

- a surge in manufacturing due to pent-up demand post-pandemic,
- adoption of smart appliances and EVs,
- imminent industrial expansion in North Georgia, and
- anticipated raw material shortages, among other reasons.

On the whole, however, short- and long-term regional predictions for specific manufacturing subsectors align.

Table 8. LONG-TERM: Fastest Growing Manufacturing Subsectors in Georgia Local Workforce Development (LWDA) Regions (2020-2030).

Manufacturing Subsector	Regions in Which Subsector is in Top Twenty Fastest Growing	
	Region	Projected Annual Growth Rate (2020-2030)
Food	Dekalb County	1.9
	Middle Georgia	1.8
	Northwest	1.3
	West Central (Three Rivers)	1.3
	Lower Chattahoochee	1.1
	Central Savannah River	0.9
	Southwest	0.9
	Georgia Mountains	0.8
	Heart of Georgia (Altamaha)	0.6
Transportation Equipment	Georgia Mountains	2.6
	Northwest	2.1
	Southern	1.8
	Heart of Georgia (Altamaha)	1.8
	East Central	1.8
	Southwest	1.3
Fabricated Metal Products	Georgia Mountains	2.4
	Northeast	2.3
	West Central (Three Rivers)	1.5
	Middle Flint	0.8
	Heart of Georgia (Altamaha)	0.7
Wood Products	East Central	1.2
	Southern	0.9
	Southwest	0.9
	Heart of Georgia (Altamaha)	0.9
	Middle Flint	0.9
Plastics and Rubber Products	Northwest	1.3
Machinery	East Central	1.0
Primary Metal	West Central (Three Rivers)	1.2
Chemical	Middle Flint	1.1

Table 9. SHORT-TERM: Fastest Growing Manufacturing Subsectors in Georgia Power Economic Development Regions (2024-2027) (Georgia Power data).*

Manufacturing Subsector	Region	Projected Growth Rate (2024–2027)
Food	East	11%
	Metro West	6%
	Central	6%
Transportation Equipment	South	9%
	Central	6%
	Coastal	6%
	West	6%
Fabricated Metal Products	West	13%
	Metro West	9%
	East	8%
	Coastal	7%
	South	7%
Machinery	Metro South	13%
	Northwest	12%
	Metro West	10%
	South	9%
	Coastal	9%
	Northeast	8%
	Metro North	7%
Wood Products	Northwest	10%
	Metro North	8%
	East	1%
Electrical Equipment, Appliance, and Components	Northeast	25%
	Metro South	16%
	Northwest	13%
	Metro North	10%
	West	9%
Furniture and Related Products	Metro South	11%
Computer and Electronic Products	Northeast	12%
Paper	Central	5%

*Data reflect the highest growth manufacturing subsectors by percentage in each region with a minimum of 1500 jobs in the region in 2024.

BLUEPRINT FOR REGIONAL MANUFACTURING EXPANSION

As discussed in Insight 2, several regions in Georgia have untapped potential in manufacturing. To boost manufacturing employment in East, West, South, and Central Georgia, the following strategic steps can leverage the regions' existing strengths and address infrastructure or workforce challenges.

- **EVs and EV Charging:** With over $27.3 billion in e-mobility investments since 2018, Georgia is, "rapidly developing as the capital of electric vehicle manufacturing in the US."[6] Responding to the need for charging stations to support EV technology adoption, Georgia is sixth in the US for public charging EV stations. Additional EV infrastructure can further stimulate adoption and manufacturing growth.
- **Food Processing:** Almost half of the United States' top 100 food processing companies have operations in Georgia, due to the high-volume agricultural industry and advanced transportation and logistics network. With Georgia's excellent logistics and ports, building cold storage hubs near ports and interstate convergences (i.e., I-16 and I-75) could assist with expanding and relocating food processing operations.
- **Advanced Manufacturing:** Projected to outpace the United States's ten-year GDP growth due to robust shipping and logistics, advanced manufacturing should focus on retaining and growing higher-skilled manufacturing jobs.
- **Agricultural value-added products:** Regions like Central and East Georgia, which have strong agricultural bases, could expand into agri-food processing or bioplastics manufacturing to capitalize on local raw material. For instance, incentives for food and beverage manufacturers could leverage existing crops like peanuts, peaches, and forestry products for processing.
- **Wood Products:** Central Georgia could develop wood products manufacturing, given its proximity to extensive forestlands. Investments in advanced wood processing technology (like cross-laminated timber) could add jobs and value.
- **Infrastructure Development:** Likely with the help of federal grants designed specifically for economic development, infrastructure development is critical. Investing in highways, rail networks, and ports would make these regions more accessible for raw materials or exports. Central Georgia, for instance, could benefit from increased connections to Savannah's port or the Atlanta logistics network. Establishing industrial parks with tax incentives, affordable utilities, and ready-to-build sites could also attract manufacturers. Coastal Georgia's Savannah Industrial Park model might be replicable for Central or East Georgia.
- **Renewable Energy:** East and West Georgia could focus on attracting solar panel or wind turbine component manufacturers. With Georgia becoming an electric vehicle hub (e.g., Rivian and Hyundai plants), regions like East or Central Georgia could target EV battery or parts manufacturers to feed these large facilities. East Georgia could explore partnerships with aerospace clusters in the Coastal region to attract component suppliers. Leveraging state and federal incentives could help build manufacturing capacity in these areas. Manufacturers of renewable energy components, batteries, and energy-efficient appliances could benefit from continued availability of tax credits and grants under the Inflation Reduction Act, e.g., Sections 45X (Advanced Manufacturing Production Tax Credit). The Georgia Job Tax Credit and Investment Tax Credit could also be promoted more aggressively to attract investment in low-employment regions. Officials could choose to identify and designate regions such as parts of Central or East Georgia as Opportunity Zones to draw private investment.

Considering only South Georgia and the Georgia-Florida border, several possibilities exist:

- **Multiple Subsectors:** This region has a history of agriculture as well as ample open land, pine forests, and proximity to automotive hubs in Alabama (Hyundai and Mercedes-Benz) and Georgia (Kia and Hyundai). These strengths lend themselves toward food processing and biomanufacturing (due to consumable agricultural commodities and feedstocks), engineered wood manufacturing, solar energy generation, and automotive manufacturing—including tire production or recycling, plastic or metal automotive parts, and EV battery component manufacturing.
- **Compatible Ventures:** Bolstering traffic through

the Cordele Inland Port to increase connections through Savannah and Jacksonville would ease logistics and raise the regional profile for manufacturers seeking to expand. Development of local recycling programs could provide a unique opportunity in the area; the US recycling industry supports over 20,000 manufacturing jobs, contributing an economic impact of over $9.8 billion to the manufacturing sector.[7] Current manufacturing leaders in South Georgia (including glass producer Arglass Yamamura, global food processor and commodities broker ADM-formerly known as Archer Daniels Midland), and veneer and plywood manufacturer Southern Veneer Products could be consulted to attract complementary businesses.

Looking beyond our nation, international partnerships possess the potential to support manufacturing growth in Georgia.

- **Foreign Investment:** Among US states, Georgia has been especially successful in attracting foreign direct investment (FDI), with 3,000 foreign-owned facilities from 60 nations in the state as of 2024 (fig. 26).[8] For instance, Japan has over 30,000 employees in Georgia—the most of any country.

INTERNATIONAL PARTNERSHIPS: CREATING OVER 8,100 NEW JOBS AND $5.9 BILLION IN INVESTMENTS WITHIN 2024 ALONE[9]

- **Europe and the Middle East:** The United Kingdom leads in the number of facilities in Georgia with 583. In 2024, Governor Kemp visited Switzerland to nourish partnerships. In 2023, similar trips by the governor were undertaken to France, Switzerland, and Israel.
- **South Korea:** In 2024, Governor Kemp visited South Korea to strengthen relationships with investors such as Hyundai. South Korea has been one of the top sources of FDI in Georgia for the past 3 years, and the trends projected from automotive manufacturing predict continuing investment.[10] Indeed, trade between South Korea and Georgia was over $15.8 billion in 2023—10% of the state's total trade.

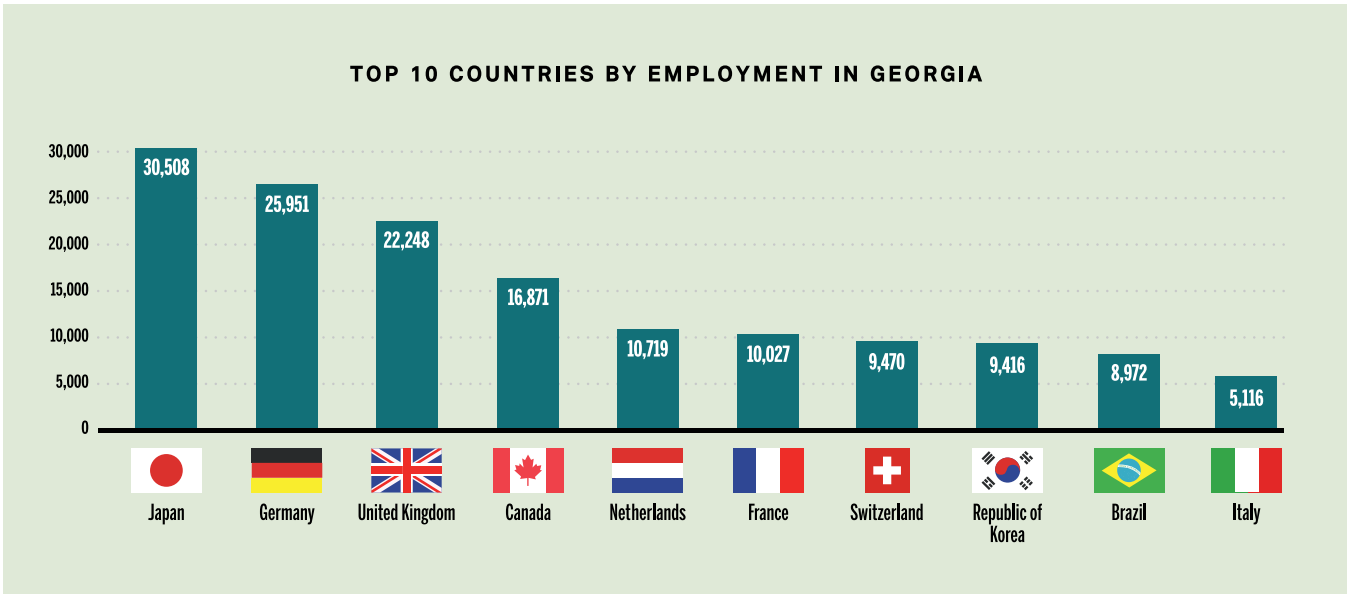


Figure 26. 2022 Top Ten Countries by Employment in Georgia. *Reproduced from Georgia.org.*

TEN KEY CHALLENGES AND SOLUTIONS

To maintain Georgia manufacturing's profile as a strong competitor to other states, several key challenges must be addressed through legislation and private means.

1. Workforce Development and Shortages: A shortage of skilled labor limits production capacity, particularly in advanced manufacturing. Addressing shortages in skilled labor requires long-term investment in education and job training. However, with manufacturers facing a turnover rate close to 60%, immediate solutions are essential. In response, during 2023 GAM conducted the first statewide workforce needs assessment. The assessment identified a critical shortage of technician-level workers and a need to fill these positions in a matter of months. GAM partnered with the Technical College System of Georgia to create fast-track training programs in entry-level production, mechanical and electrical systems, robotics, and welding for individuals without prior manufacturing experience.

As the older generations retire, valuable workers are being lost. In addition, the labor force participation rate is lower than it was even in the 1990s and birth rates are generally in decline. Solutions are many and varied, including focused outreach to future workers, a return to valuing technical education, and an emphasis on apprenticeships (see callout box).

2. Misperceptions of the Industry: The "dark, dirty, dangerous" jobs that have characterized manufacturing for decades must continue to be eliminated. In their place will be new jobs—cleaner, safer, more rewarding jobs with the potential to become durable, dynamic careers. And we are seeing this positive and exciting change already.

The United Nations' 2020 Industrial Development Report claims that although automation's expansion could make a number of manufacturing jobs vulnerable to elimination, new technologies are "likely to create new industries and new job opportunities in more skilled and knowledge-based sectors." Furthermore, the report insists that ultimately, "once indirect effects along the value chain are considered, the increase in the stock of robots used in manufacturing at the global level is actually creating employment, not destroying it."[13]

MODERN MANUFACTURERS' SKILLED LABOR NEEDS: PROBLEMS AND REMEDIES

Roger Tutterow, Professor of Economics at Kennesaw State, reflects: "Nationwide, labor markets are tight, just as they have been for quite a while, even before the pandemic….The baby boomers, the youngest of which are turning 61 this year, are starting to leave/re-leave the labor force. Likewise, the baby bust—people born between about 1965 and 1982—provide fewer workers from their era and have been a core, important part of the country's workforce. Now, as the baby boom exits, [millennials are] replacing the baby boomers. So, tight labor markets are the rule, not the exception." Also, the labor force participation rate continues to be significantly lower than it was, not just five or six years ago, but much lower than in the late 1990s." According to Dr. Tutterow: "We really need to educate young workers about the opportunities available in manufacturing. I think that to some degree, partnering up with the technical education system may be helpful because I know that many times in Georgia, unfilled jobs have been those for which the technical education system would have provided the workforce. There's a great opportunity in apprenticeships."[11] Dee Barnes, President and CEO of Evans Tool & Die/Evans Metal Stamping, Inc. agrees: "Apprenticeship trades are a positive offering of manufacturing to the next generation. These trades are about excelling in aptitude more than excelling in academics. There is opportunity for advancement upon advancement when otherwise such opportunity may not exist. In manufacturing, there are great opportunities for young people to take the time to learn a trade that is profitable for your family even if you didn't come from a world where you can get a four-year engineering degree. You can be fulfilled in creating something and using your hands."[12]

A significant shift in thinking is occurring in how workers are valued in an Industry 4.0 landscape. The new role of the industry worker includes valuing him/her as an "investment" for an organization instead of a "cost." Such a shift positions the employer as "interested in investing in skills, capabilities and the well-being of their employees, in order to attain their objectives. Such an approach is very different from merely balancing worker cost with financial revenue: human capital is more valori[z]ed and appreciated."[14]

This shift in thinking brings with it a shift in how we define modern manufacturing workers. Forbes magazine challenged false narratives related to US manufacturing, namely, "manufacturing is the epitome of a blue collar job."[15] On the contrary, changes in manufacturing have ushered in a seismic shift regarding how manufacturing functions; perceptions of manufacturing jobs as blue collar and undesirable are evaporating.

The former terminology—like "blue collar" (factory floor) or "white collar" (front office)—is ill-suited for current industry realities. Forbes instead proposed "new collar," a more appropriate description of today's manufacturing employee. Thanks to advanced manufacturing, workers are increasingly collaborating with robots and, therefore, have more opportunities to upskill and transform their "jobs" into rewarding, long-term careers.[16]

WHAT DO MANUFACTURERS THINK?

Stuart Countess, President and CEO of Kia Georgia, says "We talk constantly about workforce because people want to get into the high-tech companies, yet here in manufacturing, we're also conducting high-tech operations that job seekers are unaware of. So, it's hard to compete and get the next generation of the workforce interested in the high-tech aspects of manufacturing."[17]

3. Infrastructure and Transportation: Aging infrastructure and congested transportation routes increase costs and slow down delivery. A lack of direct rail or highway access to major ports and markets can deter large-scale manufacturers, and the infrastructure improvements suggested are costly and lengthy to implement. A legislative solution to these challenges would be continued investments in road, rail, and port infrastructure, similar to the $1.5 billion GDOT received in 2024 for transportation infrastructure improvements.[23]

ROBOTS AND COBOTS

Dr. Esben Ostergaard, a founder of Universal Robots, helped invent the "cobot."[18] Think of cobots as collaborative robots or "power tools that give craftspeople-operators superhuman powers in terms of speed and accuracy."[19] Ostergaard claims a "'human touch' revolution is now underway." Further, he says human-robot integration provides "workers [with] jobs that are more meaningful than factory jobs have been in well over a century."[20] Cobot applications include activities like welding and spray painting in the automotive industry or gluing/sealing and sanding/polishing in manufacturing. So how does it work? A human inputs commands through a "teach pendant," enabling the operator to "teach" the robot to perform specific tasks. For example, "the operator can use the pendant to guide the robot through a weld, saving the path and replicate."[21] In this era of Industry 4.0, the value of technology for manufacturing is its ability to help the industry "cope better in a changing world and economy."[22] Robotization is fueled by research and development. Humans remain crucial to creating and continuing the development of digital production technology.

4. Tax Provisions and Business Costs: High operational costs can deter investment in Georgia-based manufacturing. To its credit, Georgia already has two types of job creation tax credits and an R&D tax credit. However, reform of the convoluted and expensive bonds-for-title tax abatement program could make the state more competitive. Such programs apply to personal and real property and involve development authorities': a) issuing industrial development bonds (IDBs) to acquire or construct a project and b) "leasing the project to a company at a rent equal to debt service on the bonds."[24]

5. Energy Costs: GAM has advocated on energy issues on behalf of its members for many decades, resulting in demonstrable savings and cost avoidance in an environment of rising energy costs. Manufacturers rely on energy as a key input to the manufacturing process. Abundant, affordable energy is essential to manufacturers and to the nation's growth, prosperity and national security. The two most important factors related to energy for manufacturers are simply: reliability and affordability. Manufacturers need stable energy that can be counted on and that is competitively priced in order for manufacturers to grow, expand and flourish. Georgia should adopt policies that ensure cost-based rates and a diverse range of energy sources, including nuclear, natural gas and renewables. This diversity should be achieved through sensible regulatory oversight that favors market-based processes and competitive procurements to ensure selection of the most cost-effective resources. Investments in energy infrastructure, both nationally and within Georgia, are critically important to provide delivery of energy to manufacturers. Georgia should also ensure there is a business and regulatory climate that facilitates access to renewable energy to serve interested manufacturers without putting upward pressure on rates for non-participants.

6. Supply Chain Disruptions: Georgia manufacturers face challenges with raw material availability and increased logistics costs. Supply chain difficulties during the pandemic inspired unique solutions nationwide that may change the tides. In Maryland, existing public-private partnerships at the port have driven growth and added jobs. These investments include channel maintenance, berth deepening, and installing new electric cranes with subsector-leading lift capacity.[25] Michigan leaders created the Michigan Infrastructure Office (MIO) to coordinate with federal and state partners and leverage resources for connecting stakeholders. One of the MIO's projects has been overseeing a competitiveness fund that will use $337 million to maximize deployment of federal infrastructure, climate, and advanced manufacturing dollars. Arizona recently invested in transportation infrastructure, broadband, and a policy environment to support goods movement. Connecticut established an Office of Manufacturing, in collaboration with approximately 200 manufacturers in the state.[26] These initiatives illustrate the value of aligning strategic intentions with funding to achieve state-wide goals.

7. Regulatory Compliance: Complex and burdensome regulatory processes delay production and increase costs. Two of Georgia's most prolific subsectors, chemical and food manufacturing, are strongly affected.[27] The National Association of Manufacturers has called for action on federal regulations ranging from liquefied natural gas exports to air quality standards in power plants.[28] Research shows that the average manufacturer in the United States pays $29,100 per employee each year to comply with federal rules—the average small manufacturer pays $50,100.[29] Regulatory policy at the state level is the only source of relief for an industry crucial to Georgia's economic success.

8. Rural Manufacturing Support: Rural manufacturers face unique challenges, such as limited access to broadband, infrastructure, and skilled labor. Despite workforce and infrastructure remedies, broadband access is still a significant barrier, with 90% of unserved addresses in rural areas—even with the Georgia Broadband Program.[30] Manufacturers need broadband for real-time data management, supply chain optimization, Industry 4.0 optimization, remote monitoring and maintenance, and e-learning opportunities. Rural manufacturers would benefit from expansion of last-mile connectivity, formation of public-private partnerships, state-supported development of broadband-equipped rural industrial parks, manufacturer tax credits to offset broadband subscriptions (modeled after its residential counterpart), the instituting of a state broadband loan and grant

program, the incentivization of local Internet Service Providers, and access to additional grant funding via the USDA's ReConnect broadband loan and grant program.

An additional challenge is addressing the perception that obstacles facing rural manufacturing cannot be overcome. Some examples are:

- rural areas are likely to have fewer of the financial, professional, scientific, and information services that support manufacturing;[31] and
- multiple researchers have reported on difficulties securing access to capital to support rural businesses, as well as increased distance to market and workforce availability.[32]

When obstacles are overcome, rural manufacturing can thrive. A large-scale survey of small and medium sized enterprises (SMEs) comparing rural and urban environments showed that rural firms were more likely to report profits than their urban counterparts. Rural firms were significantly stronger exporters. There was no evidence overall that rural firms underperform urban equivalents.[33] Once established, rural firms have much to offer their communities. They can compete on a level playing field—and win.

9. Environmental Regulations: Stringent environmental regulations with unworkable ramp-up times can increase costs for manufacturers to the point of unprofitability. Regulations should be determined based on solid science and with significant input from affected industries. The Georgia attorney general has previously challenged EPA emissions rules for oil and gas producers, along with 23 other attorneys general supporting statutes that help provide energy to Georgia's industries. Georgia manufacturers have expressed difficulty meeting emissions targets due to utilities' inability to keep pace with the supply of renewable energy.[34] Coordinated outside pressure on utilities to increase renewable-to-traditional energy ratios threatens to rapidly drive prices upward for all users, including the small to mid-size manufacturers least able to afford higher rates. Respecting utility providers' plans and timelines to replace traditional sources of energy will provide manufacturers with time to plan and adapt.

10. Technology Integration: Manufacturers can struggle with integrating costly yet efficient advanced technologies such as robotics and 3D printing. While there are assistive programs—such as the Georgia Smart Communities Challenge and Georgia Artificial Intelligence in Manufacturing—manufacturers who are most in need are often too physically removed to take advantage of these opportunities easily. For example, Georgia Centers of Innovation and the Georgia Tech Manufacturing Institute are located in population centers. Publicizing the availability of this support, specifically to rural manufacturers, would benefit those who are currently least exposed to these technologies.

GEORGIA'S MANUFACTURING LEADERSHIP: SOLUTIONS THROUGH EXPERIENCE

GAM's leaders have provided insight into how Georgia supports businesses—and additional measures the state could take to increase success in the manufacturing industry. Echoing the call to listen to the needs of manufacturers is Toyo Tires President and CEO Patrick Lenz. Calling the state "friendly" to manufacturing, he shared ideas (see Insight 2) about financing transition periods for second-chance hires between incarceration and full employment to teach job skills for gainful employment.[35] This solution would simultaneously relieve workforce shortages and reduce welfare rolls. However, his suggestion, backed by his business experience, needs buy-in to be implemented.

Manufacturing leaders at the helm of companies that participate in the international marketplace have experience that results in excellent judgment and innovative suggestions. Ron Harris is the plant manager of Megadyne, a specialty belt company based in Italy, itself a subsidiary of the sixteen-company conglomerate Omega, based in Switzerland. Having also worked at Goodyear and Trex, Harris stated that, "Good infrastructure is needed for international business and Georgia has that."[36] But challenges still exist. For example, minerals from other countries are needed to produce Megadyne's products, and customs delays are affecting their bottom line. Instituting efficiencies in customs would help Georgia businesses to thrive.

The public perception of manufacturing is an issue Grenzebach Group President and CEO John Fluker believes policymakers could address. As a company that meets a multitude of needs for customized automation, Grenzebach is accustomed to considering unique possibilities. Fluker believes the workforce needs to understand all of the different types of opportunities in manufacturing. As he points out, besides production occupations, there are opportunities in HR, accounting, R&D, and engineering.[37] Targeted programming in schools and communities, spearheaded at the level of local governments, could fulfill this need.

The future of AI continues to be a pervasive topic in business and manufacturing today. When GAM manufacturing leaders were asked to speculate on how their operations might be impacted, they had differing opinions that nevertheless showed common themes. Pate Huguley of West Point Industries believes AI will change productivity, safety, training, and other aspects of manufacturing. However, just as many non-manufacturing jobs cannot be performed by AI, it is also true that "AI cannot solve the actual operation of heavy machinery that needs personalization, such as moving levers that control 400-pound loads."

Megadyne's Ron Harris shared an anecdote illustrating how AI and technology, in general, can be used to enhance productivity yet still require skilled human involvement. After receiving an order to produce belts needed to scan documents, it was determined that 250 belts could be made by hand in one month, but higher throughput would be required as the order was for 10,000 units. An enterprising employee created an automated system in six months that was able to produce 10,000 belts per month. The system is so successful that it has been shipped internationally and adapted for pumping oil and gas, as well as at airport security checkpoints to detect contraband. The originating employee has a key role in operating the production system in the Buford, Georgia, plant, showing that, "Technical people are needed to maintain systems . . . The jobs are not lost, but changed."

John Fluker of Grenzebach echoed the sentiment that technology will lead to operational efficiencies, but cannot do so on its own. Grenzebach helps design customized automation for clients, so a meaningful partnership with employees is necessary for success. Specifically, the customer's input is crucial to supply data about the process to be automated. For example, equipment may need to be reset to produce different sizes of a product. Teaching employees a multi-step process—similar to a recipe—to reliably re-set the machine is a complex procedure that cannot be mediated successfully solely through artificial intelligence.

In conclusion, as Fluker put it, "AI is a tool, but not a solution." Identifying the right applications will always be key for reliably incorporating AI into manufacturing.[38]

Undoubtedly, the future of manufacturing in Georgia is bright. Incorporating suggestions from manufacturing leaders will help to overcome challenges on the horizon.

The Smart Factory Institute's Denise Hall contends, "Smart factories will soon include an integrated network of technologies such as the Internet of Things (IoT), machine sensors, software, and cloud computing, allowing connected devices to interact with each other and the external environment . . . [bringing] a tighter form of human-machine integration to manufacturing operations."

OUTLOOK FOR THE INDUSTRY IS BRIGHT

- **Emerging Trends in Manufacturing:** Georgia is positioned to lead in innovative subsectors like modular construction, sustainable packaging, and next-generation battery technologies, with Emerging Spaces demonstrating overlap with the state's core strengths in aerospace, machinery, and fabricated metals.
- **Growth in Core Subsectors:** Manufacturing subsectors such as food, chemicals, machinery, and rubber products are expected to grow steadily, with rural regions playing a vital role due to their strong agricultural and natural resource bases.
- **Regional Workforce Growth:** While urban areas experience diverse economic growth, rural regions like Northwest and East Georgia are projected to see significant growth in manufacturing employment, highlighting the importance of infrastructure and workforce investments in these areas.
- **Regional Collaboration:** Strengthening collaborations across Georgia's local workforce development areas and aligning infrastructure projects with economic needs will ensure equitable growth across the state.
- **Challenges in Workforce Development:** A shortage of skilled labor in advanced manufacturing roles underscores the need for expanded technical education programs, apprenticeships, and initiatives to attract underrepresented groups, including women, into the manufacturing workforce.
- **Infrastructure Needs:** Aging infrastructure and insufficient transportation networks increase costs and delay production. Investments in road, rail, and broadband infrastructure are essential to improve logistics and connectivity, especially in rural areas.
- **Sustainable Energy and Environmental Challenges:** The manufacturing sector must balance renewable energy adoption with compliance to stringent environmental regulations, which requires utility policy reform and state-backed planning to ensure a stable energy supply.
- **Economic Diversification:** Strategic support for emerging manufacturing subsectors such as carbon capture, electric vehicle technologies, and agri-food processing can help diversify Georgia's economy and create long-term growth opportunities.
- **Policy Recommendations:** Streamlining regulatory processes, offering targeted tax incentives, and encouraging foreign direct investment are key to fostering a business-friendly environment and addressing operational challenges.
- **Rural Broadband Expansion:** Broadband access remains a critical barrier for rural manufacturers, necessitating last-mile connectivity projects, public-private partnerships, and state-supported industrial parks with built-in broadband.
- **Integration of Advanced Technologies:** The adoption of automation, artificial intelligence (AI), and IoT is critical for Georgia manufacturers to remain competitive, but rural manufacturers need better access to resources and outreach programs to capitalize on these innovations.

Pick and place robots handle picking up objects efficiently from one location and placing them in another.

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SUMMARY: INSIGHTS FROM THE INSIGHTS

Manufacturing, as defined by the US government, is the transformation of physical materials into new products through mechanical, physical, or chemical means. However, modern manufacturing has expanded to include nonphysical inputs like internet connectivity and software, along with smart factory production processes.

Georgia plays a crucial role in this evolving sector, employing 426,940 production workers and generating an annual output of $77 billion. Historically, manufacturing has progressed through three industrial revolutions and is currently in its fourth ("Industry 4.0"). Each has been marked by profound technological advancements. Contrary to concerns of job displacement, automation and robotics are expected to create durable, new career opportunities that require workers with advanced skills.

Georgia ranks as the eighth-largest state economy, with 2023 GRP exceeding $678 billion. This casts Georgia as a global player in economic output, benefitting from low business costs, a skilled workforce, and top-tier infrastructure. CNBC ranked Georgia's infrastructure #1 in 2023, highlighting an efficient logistics system that enables companies to use I-75, I-85, and I-95 to reach 80% of the US market within 2 days. The state also leads in clean energy production. Georgia is the only state in the US that has added nuclear generating capacity this century. Key manufacturing subsectors include food processing, chemicals, machinery, and paper, with major corporations such as Georgia-Pacific, Coca-Cola, and Gulfstream playing dominant roles. Georgia manufacturing has a significant economic impact, generating an additional $2.79 in economic activity for every $1 spent, supporting community development and long-term job stability.

Georgia's manufacturing sector spans all 21 North American Industrial Classification System subsectors, producing a diverse range of goods. The state is divided into 10 economic regions, as outlined by Georgia Power Economic Development. The Northwest region is Georgia's dominant manufacturing hub.

Georgia consistently ranks as the top state for business climate and 9th in manufacturing, according to various industry and economic organizations. However, site selection decisions for manufacturers are also influenced by logistics, workforce availability, and financial returns. Expanding existing plants is often more viable than constructing new ones, as access to capital outweighs tax rates in long-term business survival. Because rural manufacturing plants tend to survive longer than urban ones, rural industrial development is critical.

Georgia's economic incentives are reflective of its tax strategy and priorities. Transportation challenges—including traffic bottlenecks, highway congestion, port delays, rail access and inadequacy issues, as well as insufficient market-share of global cargo freighter shipping—persist. Water supply concerns further impact the industry. Workforce participation remains below pre-pandemic levels, highlighting the need for targeted labor force re-engagement.

Looking ahead, Georgia's manufacturing subsectors are expected to grow, particularly food, chemicals, machinery, and rubber products. Rural areas can capitalize on existing agricultural and natural resources. Manufacturing employment growth is projected in rural regions like Northwest and East Georgia, emphasizing the need for infrastructure improvements and workforce investments. Addressing the skilled labor shortage through expanded technical education programs, apprenticeships, and initiatives to attract underrepresented groups is essential. Upgrading aging infrastructure, improving transportation networks, and expanding broadband access will enhance logistics and connectivity, especially in rural areas. Strategically supporting emerging manufacturing subsectors such as carbon capture, electric vehicle technologies, and agri-food processing technologies will help diversify Georgia's economy and create long-term growth opportunities.

Georgia has many assets and the potential to continue its leadership in US manufacturing by relying upon its well-established subsectors while also pursing infrastructure improvements, workforce investment, and emerging trends.

GAM members and staff join elected officials in the Capitol Rotunda for GAM Day, celebrating the Association's 125th Anniversary in March 2025. *Photograph courtesy of GAM.*

APPENDICES

Appendix A. Counties Included in Georgia Power Economic Development Regions

Table 1 below shows the counties within the 10 Georgia Power Economic Development Regions, including Central, Coastal, East, Metro North, Metro South, Metro West, Northeast, Northwest, South, and West.

COUNTY	GA POWER REGIONS: selectgeorgia.com
Baldwin County	Central
Bibb County	Central
Bleckley County	Central
Candler County	Central
Dodge County	Central
Emanuel County	Central
Johnson County	Central
Jones County	Central
Laurens County	Central
Monroe County	Central
Montgomery County	Central
Putnam County	Central
Telfair County	Central
Toombs County	Central
Treutlen County	Central
Twiggs County	Central
Wheeler County	Central
Wilkinson County	Central
Appling County	Coastal
Atkinson County	Coastal
Bacon County	Coastal
Brantley County	Coastal
Bryan County	Coastal
Bulloch County	Coastal
Camden County	Coastal
Charlton County	Coastal
Chatham County	Coastal
Clinch County	Coastal
Coffee County	Coastal
Effingham County	Coastal
Evans County	Coastal
Glynn County	Coastal
Jeff Davis County	Coastal
Liberty County	Coastal
Long County	Coastal
McIntosh County	Coastal
Pierce County	Coastal
Screven County	Coastal
Tattnall County	Coastal
Ware County	Coastal
Wayne County	Coastal
Burke County	East
Columbia County	East
Glascock County	East
Hancock County	East
Jefferson County	East
Jenkins County	East
Lincoln County	East
McDuffie County	East
Richmond County	East
Taliaferro County	East
Warren County	East
Washington County	East
Wilkes County	East
Atlanta	Metro North
DeKalb County	Metro North
North Fulton County	Metro North
Gwinnett County	Metro North
Butts County	Metro South
Clayton County	Metro South
Coweta County	Metro South
Fayette County	Metro South
South Fulton County	Metro South
Henry County	Metro South
Spalding County	Metro South
Cherokee County	Metro West
Cobb County	Metro West
Douglas County	Metro West
Paulding County	Metro West
Banks County	Northeast
Barrow County	Northeast
Clarke County	Northeast
Dawson County	Northeast
Elbert County	Northeast

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COUNTY	GA POWER REGIONS: selectgeorgia.com
Forsyth County	Northeast
Franklin County	Northeast
Greene County	Northeast
Habersham County	Northeast
Hall County	Northeast
Hart County	Northeast
Jackson County	Northeast
Jasper County	Northeast
Lumpkin County	Northeast
Madison County	Northeast
Morgan County	Northeast
Newton County	Northeast
Oconee County	Northeast
Oglethorpe County	Northeast
Rabun County	Northeast
Rockdale County	Northeast
Stephens County	Northeast
Towns County	Northeast
Union County	Northeast
Walton County	Northeast
White County	Northeast
Bartow County	Northwest
Carroll County	Northwest
Catoosa County	Northwest
Chattooga County	Northwest
Dade County	Northwest
Fannin County	Northwest
Floyd County	Northwest
Gilmer County	Northwest
Gordon County	Northwest
Haralson County	Northwest
Heard County	Northwest
Murray County	Northwest
Pickens County	Northwest
Polk County	Northwest
Walker County	Northwest
Whitfield County	Northwest
Baker County	South
Ben Hill County	South
Berrien County	South
Brooks County	South
Calhoun County	South
Clay County	South
Colquitt County	South
Cook County	South
Decatur County	South
Dougherty County	South
Early County	South
Echols County	South
Grady County	South
Irwin County	South
Lanier County	South
Lee County	South
Lowndes County	South
Miller County	South
Mitchell County	South
Quitman County	South
Randolph County	South
Seminole County	South
Terrell County	South
Thomas County	South
Tift County	South
Turner County	South
Worth County	South
Chattahoochee County	West
Crawford County	West
Crisp County	West
Dooly County	West
Harris County	West
Houston County	West
Lamar County	West
Macon County	West
Marion County	West
Meriwether County	West
Muscogee County	West
Peach County	West
Pike County	West
Pulaski County	West
Schley County	West
Stewart County	West
Sumter County	West
Talbot County	West
Taylor County	West
Troup County	West
Upson County	West
Webster County	West
Wilcox County	West

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GAM President & CEO Lloyd Avram speaks at the 2024 *Made in Georgia* event in celebration of Georgia Manufacturing Day.
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