

# Manufacturing Sector

7.30.2018

NAICS CODES: 31, 32, 33

SIC CODES: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39

## Industry Overview

Companies in this industry manufacture a wide variety of goods; major product groups include food and beverages, chemicals, machinery, transportation equipment, and computers and electronics. Major companies include Boeing, Caterpillar, DowDuPont, Ford, GE, GM, HP, IBM, Pfizer, Procter & Gamble, and Tyson Foods (all based in the US); Nestlé (Switzerland), Sanofi (France), Siemens (Germany), and Toyota Motor (Japan).

The global manufacturing sector generates about \$12 trillion in annual revenue, according to the UN. Top manufacturing countries include China, the US, Japan, Germany, South Korea, India, Italy, France, and the UK. Leading exporting countries include China, the US, Germany, the UK, Japan, France, the Netherlands, and South Korea. Growth drivers include rapid industrialization in the developing world, along with the use of technology to improve products and supply chains.

The US manufacturing sector consists of about 256,000 companies with combined annual sales of about \$5.4 trillion.

## Competitive Landscape

**Globalization** has opened new markets and opportunities for manufacturers but has also created new challenges, including how to manage far-flung supply chains and distribution channels. Manufacturers have turned to digitalization to improve efficiency across every area of operations, including product development, design, production, distribution, and marketing. However, implementing a successful **digital transformation** strategy -- including the leveraging of internet of things (IoT) technology and big data -- requires careful planning and significant investment.

Demand ultimately depends on **consumer spending**. The profitability of individual companies depends on **efficient production** and **distribution**. Large companies often have large **economies of scale** in purchasing, production, and marketing. Small companies can compete effectively by producing specialized products. The US manufacturing sector is fragmented: the largest 50 companies account for less than half of overall sales.

Many US exports are goods with **high technology content**: motor vehicles and parts, semiconductors, computers, drugs, and agricultural and construction equipment. Leading export markets include Canada, Mexico, and China. A large portion of exports are components shipped to **Canadian** and **Mexican** factories for eventual re-entry to the US as finished products. Imports of manufactured goods to the US come primarily from China, Mexico, Canada, Japan, and Germany.

## Competitive Advantages

**Increasing Automation** - Automating production is becoming the dominant means for reducing labor costs as wages in the developing world have increased, particularly in China. As low-wage production centers become rarer, companies that invest in automation can gain an edge over competitors.

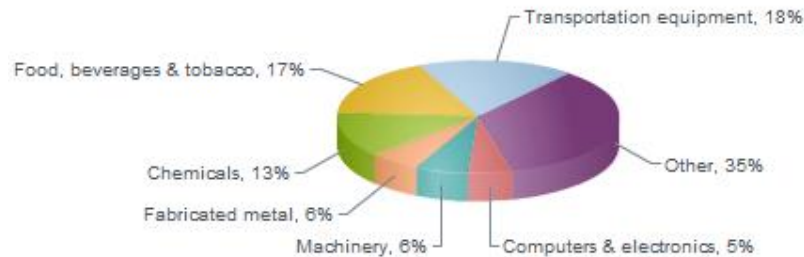
**Developing a Digital Transformation Strategy** - Whether automating production, streamlining supply chains, developing marketing campaigns, or building connectivity into products, manufacturers must develop comprehensive strategies that leverage digital technology to increase competitiveness.

**Focusing on Value-Added Products** - Industry watchers expect many manufacturers to shift to a quality-over-quantity mindset in response to the rising numbers of middle-class consumers in the developing world. As consumers' incomes increase, they make up-market purchasing choices for everything from food to automobiles.

## Products, Operations & Technology

Transportation equipment (automobiles, planes, and railroad equipment) accounts for about 18% of US manufacturing revenues; food, beverages, and tobacco products, 17%; chemicals, for 13%; fabricated metal products, 6%; machinery, 6%; computers and electronics, 5%. Other major segments include primary metals, plastic and rubber products, and paper.

### Product Segmentation by Revenue - US Census (2016)



Production operations transform **input materials**, including unfinished products and components, into finished products, using **energy**, **machinery**, and **labor**. Inputs may be raw materials (iron ore, petroleum feedstock); crops (cotton, rubber, foods); or semi-processed components (steel bars, plastic pellets, electronics, car subassemblies). To ensure availability of input materials, **supply contracts** are common. Energy, used mainly to power equipment or produce heat, is a major cost for many manufacturers. The steady rise in the cost of energy has encouraged companies to design energy-efficient production processes.

Several basic manufacturing methods are used, including **continuous process** and **batch operations**. Continuous process operations, like assembly lines, have proven to be the most efficient way to make many products, with economies increasing as greater volume is produced. These economies of scale encourage companies to grow. Batch operations are more common when customized products are made. The **efficiency of production** varies from company to company, and in many cases both the process and the final products are protected by **patents**.

The greatest production efficiencies are often achieved by companies that specialize in a particular product. Few US manufacturers today produce everything from raw materials to finished goods. A result of **specialization** is that most manufacturers make products for other manufacturers. Specialization often allows a manufacturer to have expertise in manufacturing similar products or products with similar uses.

### Technology

The US manufacturing industry has become highly automated in all aspects. US manufacturers spend about \$5 billion annually for computer equipment. Manufacturing was a lead industry in the application of **enterprise resource planning (ERP)** technology and in its evolution to an enterprise services architecture (ESA). Applying these technologies has streamlined business processes and reduced the number of labor hours required per unit of production.

Most manufacturers have automated **back office processes** such as accounting, order entry, inventory management, and HR. These processes are integrated, operating on common databases. Many companies have implemented ERP systems that include suites of applications adapted to the manufacturing industry. Adopting **industry standard packages** lowers the cost of automation and gives the company flexibility in leveraging third-party applications.

To minimize investment in materials inventory, most manufacturing companies practice some form of **just-in-time** (or lean) manufacturing. This requires the company to carefully coordinate deliveries from suppliers to minimize raw materials inventory and to coordinate deliveries to customers to minimize finished goods inventory. **Supply chain management systems** allow manufacturers, suppliers, and customers to share information on orders, schedules, and inventories to reduce inventory costs and maintain timely order fulfillment.

To remain competitive in a global economy, US manufacturers have automated production operations using machinery, robotics, and computer control systems. Much of the equipment used in manufacturing includes **programmable logic controllers (PLCs)** containing microprocessors that can be programmed. These controllers

can be networked to pass status and control information from machine to machine. In some larger operations, controllers are linked to servers that control processes among multiple machines. Factory systems are usually tied together using TCP/IP networking. Some factories are evolving to use wireless technology, driven in part by increasing use of radio frequency identification (RFID) tags.

Factory floor hardware, including portable computers, is generally **ruggedized** so that it can perform in adverse environments. The ruggedization can include shock mounting, heat sinks, fans, and hermetically sealed units.

## Sales & Marketing

Most manufacturers sell to other **manufacturers** or to **wholesalers**. Developing and maintaining **long-term relationships** with repeat customers is a major goal of marketing and sales. Sales may be handled by an in-house sales force or independent **manufacturers representatives**.

Industry trade shows and advertising in trade publications are important sources of new customers. Single or multi-year **sales contracts** are often used for large orders, and may commit the buyer to take a certain amount of product. Many products are made according to buyer specifications. For highly technical products, the sales process is often handled by engineers.

Although **pricing** is important, **product quality** and **on-time delivery** are often more important. Price pressures are high for US-based manufacturers that compete with lower-cost foreign producers. US manufacturers are increasingly focusing on specialty products that have a high technology and a low labor content.

## Finance & Regulation

Manufacturers often have **large inventories**, both of raw materials and finished goods, because production is most efficient when it's uninterrupted. To ensure the availability and costs of basic raw materials and energy, some manufacturers use futures contracts. On average for US manufacturers, inventories represent about 10% of sales and turn about six times per year. In some manufacturing industries, typically for durable goods, companies provide financing to customers by carrying large receivables. For the US sector overall, accounts receivable average about 50 days' sales. Companies in the US manufacturing sector have an average **working capital turnover** ratio of about 20%.

**Capital investments** in plant and equipment are large and must periodically be renewed. For the US manufacturing sector, annual capital expenditures average about 3% of sales. The sector is **capital-intensive**: average annual revenue per employee in the US is about \$435,000.

### Working Capital Turnover by Company Size

The working capital turnover ratio, also known as working capital to sales, is a measure of how efficiently a company uses its capital to generate sales. Companies should be compared to others in their industry.



Financial industry data provided by MicroBilt Corporation collected from 32 different data sources and represents financial performance of over 4.5 million privately held businesses and detailed industry financial benchmarks of companies in over 900 industries (SIC and NAICS). More data available at [www.microbilt.com](http://www.microbilt.com).

## Regulation

Most manufacturing operations produce **wastestreams** that must be disposed of, and may produce hazardous byproducts that can **pollute** the air, water, or ground. Many older manufacturing plants sit on contaminated land and some manufacturers are still liable for past pollution problems, including so-called Superfund sites.

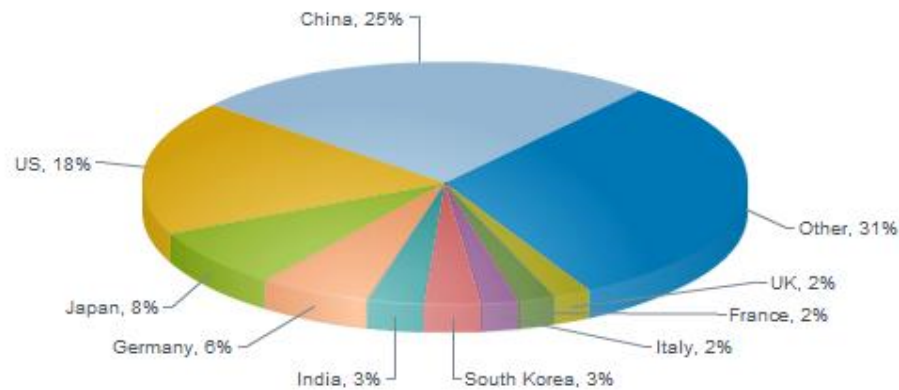
Regulation by the EPA is strict and fines can be large. Other US **regulators** of special importance to manufacturers are OSHA, for workplace safety, and the Labor Department, for employee-related issues. Many manufacturers are also affected by import and export regulations.

## International Insights

The global manufacturing sector generates about \$12 trillion in annual revenue, according to the UN. Among countries, top global producers of manufactured goods include China, the US, Japan, Germany, South Korea, India, Italy, France, and the UK.

Products vary greatly by country, but **key product groups** include food, chemicals, transportation equipment, (automobiles, aircraft, and railroad equipment), machinery, pharmaceuticals, computers and electronics, and textiles and apparel. Major manufacturing companies outside the US include Toyota Motor (Japan), Siemens (Germany), Nestlé (Switzerland), and Sanofi (France).

### Global Manufacturing Revenue - United Nations (2016)



Global manufacturing output is largely dominated by North America and Western Europe, but China's massive population, low labor costs, and government policies (including subsidies for certain industries), have helped it advance rapidly. China's **manufacturing output** has grown more than 230% since 2005. Government subsidies have, in part, helped China grow global market share in production of certain commodity products such as steel and paper. China's deep pool of **low-cost labor** has enabled its rise as a top producer of apparel and toys. However, a **growing middle class**, rising wages, and growing trade tensions with the US and the EU have caused some major Western companies to look for cheap labor in places such as Vietnam, Thailand, Cambodia, and Indonesia.

Competitive pressures from low-cost labor regions have led US manufacturers to invest in **increased automation** to make their operations more efficient. While US manufacturing employment peaked in 1979, labor productivity has increased 145% since 1987. Increasing productivity through **manufacturing technology** has kept the US, Canada, and Western Europe ahead of low-cost producers in areas of highly complex manufactured goods such as automobiles, **industrial machinery**, medical and scientific equipment, and aerospace and defense products.

China and India are making significant inroads in these and other highly complex manufacturing industries. For example, India and China each have robust **domestic auto industries** that have attracted investment from Western manufacturers. As globalization continues, wages and the ranks of the middle-class will rise, and options for low-cost labor will diminish. In such an environment, manufacturers will have to compete through **niche manufacturing** of specialized products and components, and technical expertise combined with control of intellectual property.

To better compete on technologically advanced, value-added manufactured goods, China's government is investing in the country's manufacturing sector to drive innovation and efficiency. The program aims for China's manufacturing sector to reach technological parity with those of developed countries in North America and Western Europe by 2035, and to be the world's technological leader before 2050. Areas of focus for innovation

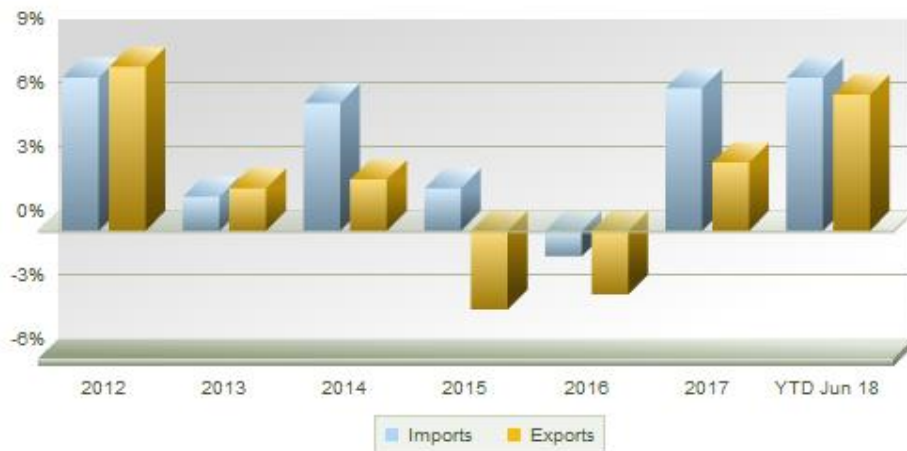
include aerospace, IT, robotics, new materials, and biotech.

By 2025, India and China together will account for 25% to 40% of global demand for goods and services, according to analysis by the University of Maryland's Smith School of Business. China surpassed the US as the world's top manufacturer in 2010, according to the UN. The US is currently ranked second behind China as the most lucrative **world economy** for near-term foreign direct investment. **Emerging nations** such as China, India, Russia, and Brazil will drive increased demand for consumer goods such as clothing, cars, food, electronics, and pharmaceuticals, which will greatly impact future corporate decisions on manufacturing and distribution center site selection.

### Change in Dollar Value of US Trade - US International Trade Commission

Imports of manufactured goods to the US come primarily from China, Mexico, Canada, Japan, and Germany. Major export markets for US manufactured goods include Canada, Mexico, China, UK, and Germany.

#### 33 MANUFACTURING



### Regional Highlights

In the US, the largest concentrations of manufacturing output are in [Texas](#), [California](#), [Ohio](#), [Michigan](#), [Illinois](#), [Indiana](#), and [Pennsylvania](#). Many specific industries are concentrated in just a few states, because of easy access to raw materials or energy sources, or proximity to customers.

### Human Resources

As manufacturing has become more automated, the role of many workers has changed from direct operations to **machinery control**. Average hourly wages for the US manufacturing sector are about the same as the national average. The design of new products and the supervision of production facilities require that manufacturers maintain a high level of **engineering expertise**.

Many manufacturing operations create **safety issues** for workers. The overall injury and illness rate for workers in manufacturing is about 25% higher than that for all US workers.

Industry Employment Growth  
Bureau of Labor Statistics



### Average Hourly Earnings & Annual Wage Increase Bureau of Labor Statistics



## Industry Growth Rating



Demand: Depends on consumer spending  
 Require efficient production and distribution  
 Risk: Economic downturns and import competition

## Call Prep Questions

### Conversation Starters

**How does the company manage fluctuations in consumer spending or economic downturns?**  
 Production in the manufacturing sector depends on consumer spending and retail sales, and can change rapidly during an economic slowdown.

**How is the company affected by imports from low-cost countries?**  
 US imports of manufactured goods have increased, because products with large labor content can be cheaper to produce in other countries.

**How does the company typically finance large R&D or capital investments?**  
 Manufacturing companies must make large investments in production equipment and computer systems to improve efficiency, and in R&D to develop new products.

**What technologies could the company use to streamline processes and reduce costs?**  
 US manufacturers use technology to lower costs, improve products, and optimize supply chain performance.

**How are improvements in logistics, like GPS, benefiting the company?**  
 To minimize inventories and speed distribution, many manufacturers invest in distribution technology and better logistics communication.



**How is the company using the internet to improve business processes?**

Many manufacturers can order parts and products through internet sites, speeding delivery and cutting out a layer of distributors.

**Quarterly Industry Update****Which segments of the company's business are showing the strongest growth?**

The US manufacturing sector remains on a growth trajectory, according to new data from the Institute for Supply Management.

**Operations, Products, and Facilities****What products does the company manufacture?**

Some manufacturers produce only one particular product that applies to only one market, while others produce thousands that appeal to different markets.

**How many production facilities does the company operate?**

The typical manufacturer has one production plant.

**To what extent does the company rely on overseas production facilities?**

Manufacturers have locations overseas because the margins are lower on goods manufactured in countries where labor is less costly.

**What manufacturing processes are used? What newer processes could be implemented?**

Continuous-process, assembly line, and batch process are common processes.

**What raw materials (or components) does the company need?**

Profit margins are affected by raw material costs.

**Who does the company buy its raw materials (or components) from?**

A company can streamline its supply chain process better by using a single supplier, a strategy that's also at greater risk from supplier shortages or limitations.

**How does the company maintain inventory levels throughout the year?**

Usually, inventories remain fairly level since production is done to order.

**How do energy prices impact production costs?**

With increasing energy costs and frequent energy shortages, high energy use can cripple a manufacturer.

**What services (such as maintenance or financing) does company offer in addition to manufactured products?**

Value-added services are a common tool for manufacturers to attract and retain customers, and to add to revenues.

**Customers, Marketing, Pricing, Competition****What kinds of customers buy the company's products?**

Some products appeal to a certain customer market and some to multiple markets.

**How large an area does the company service?**

Manufacturers can have international, national, regional, or local distribution channels.

**Who are the largest individual customers?**

Manufacturers with a few large customer accounts dominating the majority of their accounts receivables have a higher customer default risk.

**How does the company find new customers?**

Companies advertise in trade publications, use a sales force or manufacturer representatives, and participate in trade shows.

**How beneficial are trade shows for the company?**

Trade shows are an excellent way to advertise; evaluate competitors; find new suppliers, vendors, and distributors; and meet new customers.

**How does the company maintain key customer relationships?**

Some companies assign special sales representatives to big customers.

**How does the company price its products in relation to competitors'?**

Pricing strategy depends on product characteristics, the maturity of the product life cycle, the size and growth rate of the target customer market, the number of alternative products available, and the level of direct competition.

**Who are major competitors?**

Some competitors will be direct (appealing to the same specific target market) and others indirect (appealing to

the same general market).

**What competitive advantage does the company have?**

Highest quality product, unique product, lowest prices, best service, etc.

## **Regulations, R&D, Imports and Exports**

**What particular government regulations burden the company?**

Labor, environmental, trade, export, etc.

**What impact do OSHA rules or other labor standards have on the company's operations?**

OSHA and Department of Labor standards involve manufacturer investment in proper safety procedures, specified safety equipment, plant layout plans, and labor and safety record keeping processes.

**How important is effective research and development (R&D) to the company's competitiveness?**

R&D expenses for US manufacturing companies are typically about 4% to 5% of revenues.

**How do competitive imported products impact company sales?**

Most products have intense competition from less expensive imports. Many US manufacturers, especially large ones, have production facilities in other countries.

## **Organization and Management**

**If the company is a subsidiary, where do long-term goals originate?**

Parent companies can often issue many directives that control company decisions.

**How are staffing decisions affected by in-plant automation or outsourcing to contract manufacturers?**

For many manufacturers, trends toward outsourcing many manufacturing tasks and higher automation inside plants affect staffing decisions.

**How have overseas markets or outsourcing opportunities affected decisions on plant locations?**

Manufacturing jobs are increasingly being moved abroad as companies take advantage of lower labor costs and position themselves to sell products to a growing international market.

**How can ownership changes influence the company's day-to-day operations?**

M&As produce conflicts with different company cultures that can be counterproductive.

**What is the typical annual employee turnover?**

High employee turnover produces higher overhead costs for recruiting and training.

**To what industry associations does the company belong?**

Associations can be useful for political leverage, legal advice, and industry information.

## **Financial Analysis**

**How does uneven cash during the year affect the company?**

Cash flow can be impacted by uneven sales, receivables, inventory, or production.

**How does the company finance big capital investments?**

Manufacturing companies must make large investments in production equipment and computer systems to improve efficiency.

**How does the company manage volatility in raw material costs?**

To ensure the availability and costs of basic raw materials and energy, some manufacturers use futures contracts.

**What is the company's average inventory level?**

Some manufacturers may carry significant inventories of finished goods, semi-finished goods, and raw materials.

## **Business and Technology Strategies**

**What growth plans does the company have?**

Growth often comes through acquisitions.

**What factors influence adding automation in the company's plants?**

Automation is the only way many manufacturers can compete with goods from low-cost countries.

**What advantages can acquisitions have for the company's operations?**

Acquisitions can absorb competition, allow new technologies or patents to be bought, expand product or service capabilities, or control the supply chain.

**What opportunities does the company see to improve energy efficiency?**



Because many production techniques were designed in an era of lower energy costs, manufacturers can often redesign processes to reduce energy use.

#### **How can green initiatives impact the company?**

Green investments can provide an attractive return and allow the company to market a positive environmental message to customers and investors.

## Quarterly Industry Update

### **7.30.2018**

**Opportunity: US Manufacturing Growth Continues** - The US manufacturing sector remains on a growth trajectory, according to new data from the Institute for Supply Management (ISM). Overall, manufacturers in June 2018 reported continued growth in production, new orders, and employment, but while production growth gained steam, new orders and employment growth slowed in June compared to the prior month. Of the 18 manufacturing industries covered in the ISM report, 17 reported growth in June, including wood products; electrical equipment, appliances, and components; fabricated metal products; computer & electronic products; food, beverage, and tobacco products; transportation equipment; machinery; primary metals; chemical products; and petroleum and coal products. While the manufacturing sector is generally enjoying robust demand, the ISM suggested that the attention of many companies has been diverted to creating contingency plans because of the ongoing trade strife between the US and key trading partners. Some manufacturers reported considering moving production out of the US to avoid tariffs on US goods. The ISM also suggests that US tariffs on imported steel and aluminum, combined with trucking shortages, are creating supply chain issues for some manufacturers.

**Industry Impact** - While demand remains strong across a wide spectrum of the US manufacturing sector, some companies may review their manufacturing footprint and supply chain strategies amid emerging trade relations and transportation challenges.

### **4.30.2018**

**Opportunity: US Durable Goods Orders Rise** - US orders for durable goods, a demand indicator for a wide variety of manufactured products, increased 8.9% in the first two months of 2018 compared to the same period a year earlier. Orders for primary metals increased 13.5%, and fabricated metal product orders grew 11.9%. Led by strong demand for construction machinery and mining, oil field, and gas field equipment, machinery orders saw a gain of 9.2%. Orders for computers and electronic products rose 6%, and transportation equipment orders expanded 10.3%. Electrical equipment, appliance, and component orders increased 1.9%. The recent uptick in capital spending may indicate that companies are increasing business investment after the passage of tax cuts late in 2017, according to The Wall Street Journal. However, some manufacturers are concerned that rising trade tensions with China could undercut recent gains in US manufacturing by driving raw materials costs higher, complicating supply chains, and reducing demand for US exports.

**Industry Impact** - A rise in durable goods orders may indicate businesses are increasing their capital spending. This could prompt some manufacturers to adjust their production, marketing, and inventory strategies to meet any growth in demand.

### **1.29.2018**

**Opportunity: Gains in Orders, Production Spur US Manufacturing Growth** - More domestic business investment, improving global economies, and steady US household spending are fueling American manufacturing growth, according to Bloomberg's analysis of the latest forecast from the Institute for Supply Management (ISM). US manufacturing revenue is predicted to increase more than 5% in 2018 compared to 2017, and 16 out of the 18 manufacturing industries reported growth in December 2017, led by machinery and computer and electronic products. Manufacturers are optimistic about improving margins and increases in exports and imports; capital expenditures in the sector are forecast to increase 2.7% in 2018 versus 2017. Despite the rosy outlook, challenges for manufacturers remain, including reported difficulty finding highly-skilled labor, needing to pay higher wages to attract the necessary workforce, and increasing raw material pricing pressures.

**Industry Impact** - Continued manufacturing sector growth in 2018 may prompt some manufacturers to adjust their production and marketing strategies to meet any uptick in demand.

### **10.23.2017**

**Opportunity: US Durable Goods Orders Rise** - In a sign that US manufacturing activity continues to gain momentum, US durable goods orders rose more than 5% in the first eight months of 2017 compared with the same period a year earlier. Primary metals orders, an upstream indicator of overall durable goods demand, increased 11%. New orders of fabricated metal products grew nearly 9%, and machinery orders climbed more than 6%. In the machinery category, orders for mining, oil field, and gas field equipment; construction

machinery; and material handling equipment all saw strong double-digit growth. Transportation equipment orders rose more than 4%. Durable goods demand has been boosted by increased investment in the energy sector which has increased oil and gas drilling activity since curbing production due to low prices in 2015 and 2016, according to Reuters.

**Industry Impact** - If durable goods orders remain strong, manufacturers may adjust production, capital spending, marketing, and/or staffing strategies to meet any ongoing uptick in demand.

## Industry Indicators

Total US manufacturers' shipments, which indicate manufacturing sector activity, rose 7.2% year-to-date in June 2018 compared to the same period in 2017.

The spot price of crude oil, which indicates energy prices paid by manufacturers, rose 40.3% in the week ending August 3, 2018, compared to the same week in 2017.

## Industry Forecast

Revenue (in current dollars) for the US manufacturing sector is forecast to grow at an annual compounded rate of 4% between 2018 and 2022, based on changes in physical volume and unit prices. Data Published: January 2018



First Research forecasts are based on INFORUM forecasts that are licensed from the Interindustry Economic Research Fund, Inc. (IERF) in College Park, MD. INFORUM's "interindustry-macro" approach to modeling the economy captures the links between industries and the aggregate economy. [Forecast FAQs](#)

## Companies

Company	Country	Sales
<b>Dongguan Jinye Jewelry Arts &amp; Crafts Factory</b>	China	\$7,140,160.63M
<b>Ape Indústria e Comércio Ltda</b>	Brazil	\$612,325.70M
<b>PETNESIA RESINDO, PT</b>	Indonesia	\$407,677.76M
<b>China Petroleum and Chemical Corporation</b>	China	\$362,400.07M
<b>Agilent Technologies (Shanghai) Co., Ltd.</b>	China	\$335,391.10M
<b>China Petrochemical Corporation</b>	China	\$283,370.61M
<b>TOYOTA MOTOR CORPORATION</b>	Japan	\$276,511.46M

VOLKSWAGEN AG	Germany	\$276,325.56M
Taiyuan Communication Industry Co., Ltd.	China	\$272,230.45M
BP P.L.C.	England	\$240,208.00M
Exxon Mobil Corporation	United States	\$237,162.00M
Apple Inc.	United States	\$229,234.00M
Samsung Electronics Co., Ltd.	South Korea	\$224,340.57M
Guangdong SOFO Electronics Industrial Co., Ltd.	China	\$209,334.92M
Daimler AG	Germany	\$196,844.92M
Pemex Transformación Industrial	Mexico	\$196,131.92M
CenTech Specialty Vehicles Co., Ltd.	China	\$170,597.54M
HON HAI PRECISION INDUSTRY CO., LTD.	Taiwan	\$158,402.11M
Chevron U.S.A. Inc.	United States	\$157,198.00M
Ford Motor Company	United States	\$156,776.00M
TOTAL SA	France	\$149,099.00M
General Motors Company	United States	\$145,588.00M
HONDA MOTOR CO., LTD.	Japan	\$144,574.67M
Beijing Zhongxing Shitong Electronic Technology Co., Ltd.	China	\$144,198.92M
Jilin Yuguang Painting Co., Ltd.	China	\$141,989.88M
Chevron Corporation	United States	\$134,674.00M
Shenzhen Pingshan Industrial Co., Ltd.	China	\$134,117.91M
SAIC Motor Corporation Limited	China	\$133,683.89M
FIAT CHRYSLER AUTOMOBILES N.V.	England	\$132,883.80M
Shanghai Automotive Industry Corporation (Group)	China	\$131,739.73M

## Industry Drivers

Changes in the economic environment that may positively or negatively affect industry growth.

Data provided by First Research analysts and reviewed annually



**Energy Prices** Change in crude oil and related energy prices



**Interest Rates** Change in prime and related interest rates



**Technology Innovation** Advances in science and technology, including information technology



**Commodity Prices** Changes in prices for commodities, such as crops, metals, and other raw materials

## Critical Issues

**Highly Dependent on Consumer Spending** - Production in the manufacturing sector depends on consumer spending and retail sales, and can change rapidly during an economic slowdown. For example, industrial production rose by about 2% per year on average between 2002 and 2007, but fell 10% between 2007 and 2010. In some subsectors, such as automobiles and primary metals, production dropped 25% or more during the late 2000s recession.

**Competition from Low-Cost Imports** - US imports of manufactured goods have increased, because products with large labor content can be cheaper to produce in other countries. To remain competitive, many US manufacturers have moved production facilities abroad or have shifted to products with higher technology content. In dollar terms, the US imports nearly three times the amount of manufactured goods from China as from Canada. In recent years Mexico has overtaken Canada to become the second-largest source of US imports.

## Business Challenges

**Large R&D Spending, Capital Expenditures Required** - Manufacturing companies must make large investments in production equipment and computer systems to improve efficiency, and in R&D to develop new products. R&D expenses for US manufacturing companies are typically about 4 to 5% of revenue, but can be as high as 10 to 15%. Capital expenditures average about 3% of revenue.

**Volatile Energy, Raw Material Costs** - Scarcity of resources and long supply routes contribute to frequent changes in prices for energy and for many raw materials used by manufacturers. Steel prices, for example, can change by more than 30% from year to year. Crude oil and natural gas prices can also move more than 30% annually.

**Extensive Government Regulation** - To protect workers and prevent pollution, states and the federal government regulate many activities of manufacturing companies. Such regulations can add to the cost of production. Government regulations also affect imports and exports of many raw materials and manufactured products.

**Dependence on Few Large Customers** - Because of consolidation in many parts of the US economy, and because of their own specialization, many manufacturers depend heavily on a small number of big customers for a large part of their revenue. In many cases, because no alternative market exists, manufacturers are essentially production arms of their customers. In some instances, the US government is a company's major customer.

## Business Trends

**More Automation, Less Labor** - Productivity has steadily increased in manufacturing because of the increasing use of machines and, especially, computers. Generally, the US industries that have prospered in the past decade have been those where the most automation has been possible and where technology content is high. Manufacturing output per hour between 2008 and 2017 increased nearly 10%.

**Outsourcing and Leasing** - To increase operational efficiency by concentrating resources on primary production and marketing functions, many companies have outsourced services they previously did themselves, such as parts manufacture, maintenance, computer and payroll services, and benefits management. As product life cycles get shorter, building proprietary assembly lines becomes less practical. Contract manufacturers have made it possible for some companies to operate without owning any brick-and-mortar factories. Many manufacturers have also increased the efficiency of their assets by leasing, rather than owning, equipment and facilities.

**More Service Required** - The greater technological content of many machines and products requires more complicated support such as training, maintenance, operations, and services. Some companies, like IBM, sell more services related to their product than they do the product itself. Large-scale use of computers has created demand for IT services in many industries.

**Manufacturing Globalization** - The development of international logistics networks that can efficiently deliver raw materials and finished products to many parts of the world has increased the reach of US manufacturers and international competitors. US manufacturers in labor-intensive industries such as apparel now have most of their production facilities abroad. Factories are frequently located in countries for tax, labor costs, or political reasons,

rather than proximity to raw materials or markets, as was once the case.

**More Alliances, Strategic Investments** - The large resources required for many business enterprises, especially in the international sphere, encourage manufacturers to ally with other companies. In some cases, partners produce different components for a product; in others, one partner makes the product while the other provides distribution. Relationships between manufacturers and their suppliers also often take the form of alliances, with strong integration of information systems and regular production consultations. Many large companies now hold "strategic stakes" in smaller companies that are developing new products or markets, enabling them to essentially farm out their R&D efforts.

**Reshoring US Manufacturing** - Rising wages in the developing world and the complications of far-flung supply chains are causing some US manufacturers to bring back jobs that had been outsourced to other countries. In 2017, US manufacturing jobs created by reshoring and foreign direct investment reached more than 170,000, according to the Reshoring Initiative. Between 2004 and 2016, China's manufacturing cost advantage over the US fell from 14% to about 1%, according to the Boston Consulting Group.

## Industry Opportunities

**Technological Innovation** - US manufacturers use technology to lower costs, improve products, and optimize supply chain performance. The US manufacturing sector is evolving toward providing goods that either have a high technology component or are produced with technologically advanced equipment. Biotech and fiber optics are examples of rapid movement from research labs to production facilities.

**Improved Logistics** - To minimize inventories and speed distribution, many manufacturers invest in distribution technology and better logistics communication. Advancements include satellite communication links with delivery trucks, cargo containers with communication capabilities, specialized cargo ships that can be unloaded in hours, and radio frequency identification (RFID) tags that allow individual products to be tracked. Improved communication between suppliers and manufacturers eases production scheduling and product flow.

**Business-to-Business Internet Communication** - Many manufacturers can order parts and products through internet sites, speeding delivery and cutting out a layer of distributors. Internet auction sites let suppliers bid to fill supply contracts. The success of internet-based procurement is closely tied to the continuing growth and refinement of logistics networks, so suppliers can keep delivery costs low.

**Improved Energy Use** - Because many production techniques were designed in an era of lower energy costs, manufacturers can often redesign processes to reduce energy use. Some manufacturers use large amounts of energy in production. Due to the high cost of converting to energy-efficient systems, manufacturers are reluctant to approve such projects unless energy costs are projected to remain high.

**Green Manufacturing Practices** - In addition to investing in energy efficiency, manufacturers are also redesigning plants and processes to reduce emissions and the company's carbon footprint. These green investments can provide an attractive return and allow the company to market a positive environmental message to customers and investors. In recent years the EPA has created national emission standards for hazardous air pollutants.

## Executive Insight

### Chief Executive Officer - CEO

#### Competing with Low-Cost Imports

Imports of manufactured goods to the US have increased steadily, because products with a large labor content can be cheaper to produce in other countries. US companies have automated production as much as possible to lower the labor content and have implemented lean manufacturing to reduce waste and costly inventories. US manufacturers keep complex manufacturing at home while offshoring some mass manufacturing and taking advantage of established brand names and distribution pipelines.

#### Moving Manufacturing Offshore

Any product with high labor content is susceptible to being manufactured more economically in a low-wage country. This is particularly true of small items that don't have high shipping costs, such as handtools, electronic products, textiles, etc. Many companies have adopted a strategy of either setting up manufacturing plants overseas or contracting with an overseas supplier to produce merchandise with their name.

### Chief Financial Officer - CFO

### **Substituting Capital for Labor**

Manufacturing domestically allows better management oversight and responsiveness to customers' evolving needs. To make domestic manufacture cost-competitive with low-cost imports, companies must minimize labor content by automating production. Manufacturing automation requires expensive networked intelligence systems and robotics. Factory automation is generally financed through long-term bank loans or capital placements.

### **Outsourcing Noncore Functions**

Outsourcing noncore functions allows management to increase operational efficiency by concentrating resources on primary production and marketing functions. Many companies are outsourcing services they previously did themselves, like parts manufacture, maintenance, computer and payroll services, and benefits management. As product life cycles have contracted, building proprietary assembly lines has become less practical. In the telecom industry, contract manufacturers have made it possible for companies to increase efficiency by leasing, rather than owning, equipment and employees.

## **Chief Information Officer - CIO**

### **Supporting Lean Manufacturing**

Lean manufacturing is a continuous process whereby all processes and operations are examined to eliminate (or minimize) waste: wasted feedstock; wasted motion; wasted product (below quality standards); wasted time (inventories, moving in-process materials, etc). Processes are defined, analyzed, and redesigned to be more efficient. Once implemented, processes are continually re-evaluated and refined to make them still more efficient. Information systems must be designed to be flexible to support process changes, provide the real time data required for lean manufacturing, and integrate with both suppliers and customers.

### **Applying Technology Inventively**

Investors and other equity holders demand better margins, more product innovation, and quicker time-to-market for new products. Manufacturers use technology to lower costs, improve products, and optimize supply chain performance. The US manufacturing sector is evolving toward producing goods with either a high-tech component or that are fabricated with technologically advanced equipment.

## **Human Resources - HR**

### **Overseeing Personnel Needs During Outsourcing**

Outsourcing has become a fact for most manufacturing companies. Factories can be sold to other manufacturing companies or companies can outsource noncore operations, such as accounting, payroll, benefits programs, IT, etc. Staff is generally part of the outsourcing process, either moving to the outsourcer or being laid off by the manufacturer. HR must evaluate the benefit status of each employee and assure that they're accommodated.

### **Implementing Safety Training Programs**

Many manufacturing jobs are semi-skilled and require expertise in operating specialized machinery. Safety has improved, but the rate of injury and illness for the manufacturing sector in the US is about 25% higher than the national average. To minimize company liability, HR must implement training programs for the safe and efficient operation and maintenance of all equipment, ensure that staff members attend training, and oversee training compliance.

## **VP Sales/Marketing - Sales**

### **Developing Sales Channels**

Sales and distribution channels are critical to manufacturing companies. Once customer and distributor relationships have been established, companies can relocate or outsource manufacturing facilities without disrupting the customer relationships. Developing and maintaining long-term relationships with repeat customers is a crucial part of marketing, which may be handled by an in-house sales force, independent manufacturer representatives, or distributor sales staff, and augmented by marketing at industry trade shows and through advertising. Manufacturers may participate in cooperative advertising with industrial customers. For example, tire and auto manufacturers may advertise jointly on a national level.

### **Marketing Globally**

Manufacturing has become global with plants established as needed, where needed. Procter & Gamble, for example, operates about 110 manufacturing sites in about 40 countries. As plants are located to accommodate local markets, marketing is taking advantage to increase regional sales.

## **Executive Conversation Starters**

### **Chief Executive Officer - CEO**

**What strategies does the company use to compete with low-cost imports?**



Companies maximize automation of specialized US manufacturing, offshore mass production, and use known brand names and distribution pipelines.

**How important to the company's strategy is moving some or part of manufacturing offshore?**

Many companies either set up manufacturing plants overseas or contract production by an overseas supplier.

**Chief Financial Officer - CFO**

**How do automation increases and labor decreases affect the company's need for capital?**

Companies minimize labor by increasing automation, which requires financing to acquire expensive networked systems and robotics.

**What functions does the company outsource to gain efficiencies?**

Many companies outsource parts manufacture, maintenance, computer and payroll services, and benefits management.

**Chief Information Officer - CIO**

**How have the company's IT systems been designed to support lean manufacturing?**

Information systems must be designed to be flexible to support process changes, provide the real-time data required for lean manufacturing, and integrate with both suppliers and customers.

**What types of new production-related technology look most promising to the company?**

Manufacturers use technology to lower costs, improve products, and optimize supply chains.

**Human Resources - HR**

**What personnel challenges does the company have when outsourcing?**

Companies often lay off or transfer employees to outsourcers, both of which require evaluating and upholding each person's benefit status.

**How important is safety training for the company?**

Safety training helps minimize company liability for accidents, so training focuses on safely and efficiently operating and maintaining equipment.

**VP Sales/Marketing - Sales**

**What sales channels are most effective for the company?**

Manufacturers often use a combination of an in-house sales force, independent manufacturer reps, and distributors.

**What plans does the company have to market globally?**

When companies open factories close to global markets or sell internationally, marketing adapts to the local language and culture.

## Financial Information

### COMPANY BENCHMARK TRENDS

#### Quick Ratio by Company Size

The quick ratio, also known as the acid test ratio, measures a company's ability to meet short-term obligations with liquid assets. The higher the ratio, the better; a number below 1 signals financial distress. Use the quick ratio to determine if companies in an industry are typically able to pay off their current liabilities.



Financial industry data provided by MicroBilt Corporation collected from 32 different data sources and represents financial performance of over 4.5 million privately held businesses and detailed industry financial benchmarks of companies in over 900 industries (SIC and NAICS). More data available at [www.microbilt.com](http://www.microbilt.com).

### Current Liabilities to Net Worth by Company Size

The ratio of current liabilities to net worth, also called current liabilities to equity, indicates the amount due creditors within a year as a percentage of stockholders' equity in a company. A high ratio (above 80 percent) can indicate trouble.



Financial industry data provided by MicroBilt Corporation collected from 32 different data sources and represents financial performance of over 4.5 million privately held businesses and detailed industry financial benchmarks of companies in over 900 industries (SIC and NAICS). More data available at [www.microbilt.com](http://www.microbilt.com).

### COMPANY BENCHMARK INFORMATION

NAICS: 31, 32, 33

Data Period: 2016

Last Update May 2018

Table Data Format

Mean

Company Size	All	Large	Medium	Small
Size by Revenue		Over \$50M	\$5M - \$50M	Under \$5M
Company Count	220836	3446	20683	196707

## Income Statement

<b>Net Sales</b>	100%	100%	100%	100%
<b>Gross Margin</b>	31.2%	31.5%	31.1%	33.0%
<b>Officer Compensation</b>	2.0%	1.8%	2.3%	3.1%
<b>Advertising &amp; Sales</b>	1.0%	1.0%	0.8%	0.8%
<b>Other Operating Expenses</b>	25.9%	26.7%	25.4%	26.3%
<b>Operating Expenses</b>	28.8%	29.5%	28.4%	30.2%
<b>Operating Income</b>	2.4%	2.0%	2.7%	2.8%
<b>Net Income</b>	1.0%	0.8%	1.1%	1.2%

## Balance Sheet

<b>Cash</b>	10.4%	12.4%	9.8%	9.8%
<b>Accounts Receivable</b>	21.4%	21.4%	22.7%	22.8%
<b>Inventory</b>	18.2%	15.7%	20.9%	20.4%
<b>Total Current Assets</b>	56.3%	56.6%	59.3%	59.0%
<b>Property, Plant &amp; Equipment</b>	24.2%	21.5%	25.3%	25.6%
<b>Other Non-Current Assets</b>	19.5%	21.9%	15.4%	15.4%
<b>Total Assets</b>	100.0%	100.0%	100.0%	100.0%
<b>Accounts Payable</b>	11.8%	12.8%	12.2%	12.0%
<b>Total Current Liabilities</b>	27.7%	29.3%	29.0%	28.7%
<b>Total Long Term Liabilities</b>	24.9%	23.6%	26.6%	28.7%
<b>Net Worth</b>	47.5%	47.2%	44.4%	42.6%

## Financial Ratios

(Click on any ratio for comprehensive definitions)

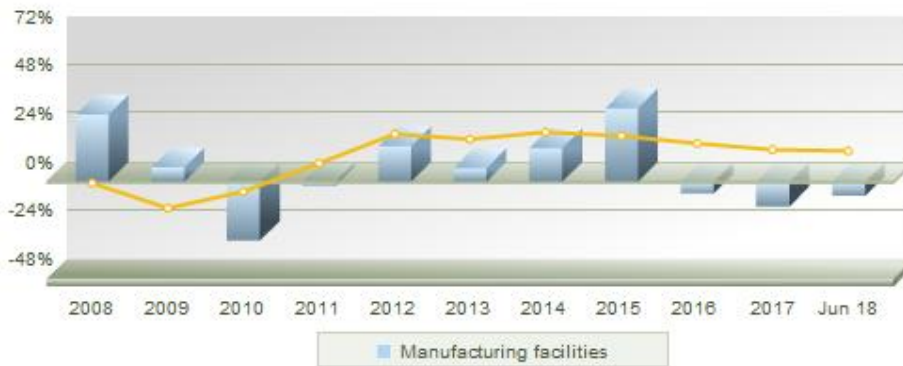
<b>Quick Ratio</b>	1.20	1.21	1.17	1.19
<b>Current Ratio</b>	2.03	1.94	2.05	2.05
<b>Current Liabilities to Net Worth</b>	58.3%	62.0%	65.2%	67.4%
<b>Current Liabilities to Inventory</b>	x1.52	x1.87	x1.39	x1.40
<b>Total Debt to Net Worth</b>	x1.11	x1.12	x1.25	x1.35
<b>Fixed Assets to Net Worth</b>	x0.51	x0.46	x0.57	x0.60
<b>Days Accounts Receivable</b>	55	59	50	50
<b>Inventory Turnover</b>	x5.38	x5.82	x5.44	x5.47
<b>Total Assets to Sales</b>	70.2%	74.3%	60.8%	60.0%
<b>Working Capital to Sales</b>	20.1%	20.3%	18.5%	18.2%
<b>Accounts Payable to Sales</b>	8.3%	9.6%	7.4%	7.2%
<b>Pre-Tax Return on Sales</b>	1.5%	1.3%	1.8%	1.9%

<b>Pre-Tax Return on Assets</b>	2.2%	1.8%	2.9%	3.2%
<b>Pre-Tax Return on Net Worth</b>	4.6%	3.7%	6.5%	7.4%
<b>Interest Coverage</b>	x1.84	x1.60	x2.16	x2.26
<b>EBITDA to Sales</b>	5.8%	5.3%	5.8%	6.1%
<b>Capital Expenditures to Sales</b>	3.5%	3.2%	3.3%	3.3%

Financial industry data provided by MicroBilt Corporation collected from 32 different data sources and represents financial performance of over 4.5 million privately held businesses and detailed industry financial benchmarks of companies in over 900 industries (SIC and NAICS). More data available at [www.microbilt.com](http://www.microbilt.com).

## ECONOMIC STATISTICS AND INFORMATION

### Annual Construction Put into Place - Census Bureau



### Index of Industrial Production - Federal Reserve Board



## VALUATION MULTIPLES

### Manufacturing Sector

Acquisition multiples below are calculated medians using at least three US private industry transactions completed between 1/2007 and 10/2017 and are based on middle-market transactions where the market value of invested capital (the selling price) was less than \$1B. Data updated annually. Last updated: December 2017.

Valuation Multiple	MVIC/Net Sales	MVIC/Gross Profit	MVIC/EBIT	MVIC/EBITDA
Median Value	0.7	1.6	6.2	5

**MVIC (Market Value of Invested Capital)** = Also known as the selling price, the MVIC is the total consideration paid to the seller and includes any cash, notes and/or securities that were used as a form of payment plus any interest-bearing liabilities assumed by the buyer.

**Net Sales** = Annual Gross Sales, net of returns and discounts allowed, if any.

**Gross Profit** = Net Sales - Cost of Goods Sold

**EBIT** = Operating Profit

**EBITDA** = Operating Profit + Noncash Charges



SOURCE: Pratt's Stats, 2018 (Portland, OR: Business Valuation Resources, LLC). Used with permission. Pratt's Stats is available at <http://www.bvresources.com/prattsstats>

## Industry Websites

### **AFL-CIO**

Labor issues.

### **Canadian Manufacturers & Exporters**

Media, events, and links.

### **Industry Canada - Manufacturing**

Government site reporting manufacturing industry statistics.

### **Institute for Supply Management**

Indexes of manufacturers purchasing activity, price activity. Benchmark data for select industries.

### **Manufacturing & Technology News**

News archive.

### **Manufacturing.Net**

News, news archive. Stock prices. Good discussion of issues in Automation & Control, Design, Mfg. Processes, Plant Operations, and Supply Chain.

### **National Association of Manufacturers**

Policy issues.

### **The Conference Board**

Economic information, news, and events.

## Glossary of Acronyms

**ISM** - Institute for Supply Management

**NAM** - National Association of Manufacturers

**WTO** - World Trade Organization