

E-Stats 2019: Measuring the Electronic Economy

Economy-Wide Statistics Briefs

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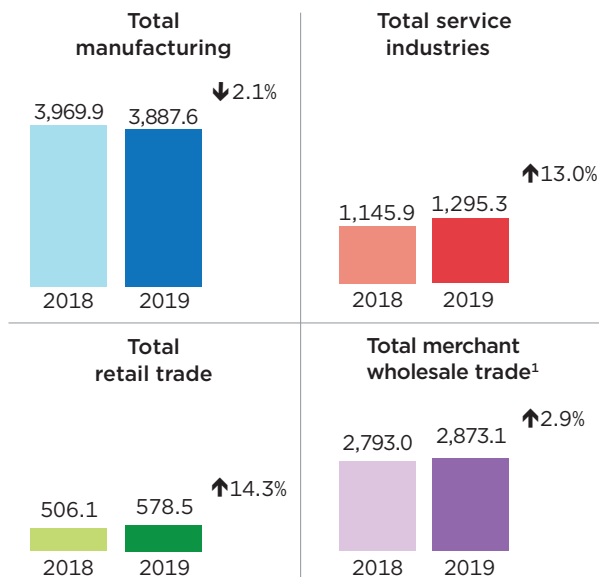
E19-ESTATS

The 2019 E-Stats provides estimates of e-commerce activity in key sectors of the U.S. economy for 2019, revises previously released estimates for 2018 and earlier, and places these estimates in historical context.

Figure 1.

E-Commerce Total Shipments/Sales/Revenues: 2018 and 2019

(In billions of dollars)



¹ Total merchant wholesale trade including manufacturers' sales branches and offices.
Note: For the estimates of e-commerce total shipments, sales, and revenues, measures of sampling variability are available at www.census.gov/programs-surveys/e-stats/data/tables.html.
Source: U.S. Census Bureau, 2019 Annual Survey of Manufactures, 2019 Annual Wholesale Trade Survey, 2019 Annual Retail Trade Survey, and 2019 Service Annual Survey.

Underlying data are collected in separate surveys of manufacturing, wholesale, service, and retail businesses. Data tables for each sector are available at www.census.gov/programs-surveys/e-stats/data/tables.html.

MANUFACTURING

E-commerce shipments of U.S. manufacturers were \$3,887.6 billion in 2019, down 2.1 percent from a revised \$3,969.9 billion in 2018 (Figure 1). Total shipments were \$5,731.2 billion in 2019, down 2.7 percent from \$5,890.7 billion in 2018.

E-commerce shipments were 67.8 percent of all manufacturing shipments in 2019, up from 67.4 percent in 2018 (Figure 2).

In 2019, 13 North American Industry Classification System (NAICS) subsectors had e-commerce shipments that accounted for more than 60.0 percent of their total manufacturing shipments, led by NAICS 336 (81.8 percent), transportation equipment manufacturing; NAICS 312 (79.4 percent), beverage and tobacco product manufacturing; and NAICS 322 (74.9 percent), paper manufacturing.

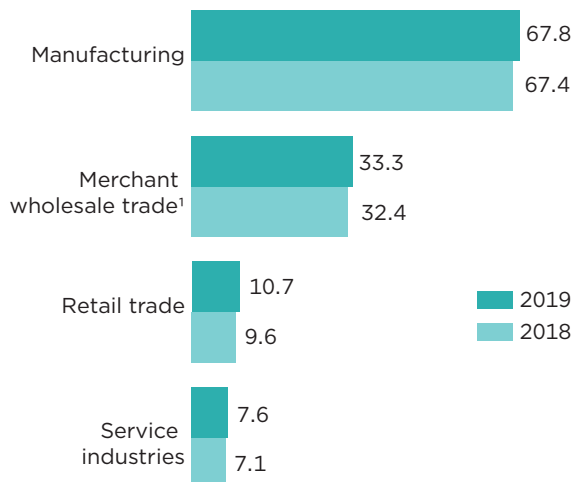
More information is available from Table 1 *U.S. Manufacturing Shipments—Total and E-Commerce Value: 2019 and 2018*.

SERVICES

Revenues from electronic sources for service industries in the United States were \$1,295.3 billion in 2019, up 13.0 percent from a revised \$1,145.9 billion in 2018.

Figure 2.

E-Commerce as a Percentage of Total Shipments/Sales/Revenues: 2018 and 2019



¹ Total merchant wholesale trade including manufacturers' sales branches and offices.

Note: For the estimates of e-commerce as a percentage of total shipments, sales, and revenues, measures of sampling variability are available at <www.census.gov/programs-surveys/e-stats/data/tables.html>.

Source: U.S. Census Bureau, 2019 Annual Survey of Manufactures, 2019 Annual Wholesale Trade Survey, 2019 Annual Retail Trade Survey, and 2019 Service Annual Survey.

Total revenues were \$17,014.9 billion in 2019. Revenues from electronic sources were 7.6 percent of total revenues in 2019, up from a revised 7.1 percent in 2018 (Figure 2).

More information is available from Table 3 U.S. Services Revenue—Total and Revenue From Electronic Sources: 2019 and 2018.

RETAIL

Sales from e-commerce for U.S. retailers were \$578.5 billion in 2019, up 14.3 percent from a revised \$506.1 billion in 2018 (Figure 1). Total sales increased by 3.0 percent to \$5,411.0 billion in 2019 from a revised \$5,253.0 billion in 2018.

E-commerce sales were 10.7 percent of total sales in 2019, up from a revised 9.6 percent in 2018 (Figure 2).

More information is available from Table 4 U.S. Retail Trade Sales Total and E-Commerce: 2019 and 2018.

Supplemental tables utilizing annual data on total and e-commerce sales by primary business activity for Electronic Shopping and Mail-Order Houses (NAICS 4541) for 2015–2019 were released on January 28, 2021.

On a quarterly basis, the U.S. Census Bureau publishes the Quarterly Retail E-Commerce Sales Report, which provides national total retail e-commerce sales estimates. An experimental Supplemental Quarterly Retail E-Commerce table is also published that provides e-commerce sales by retailers' primary kind of business.

WHOLESALE

Total e-commerce sales for merchant wholesalers in the United States, including manufacturers' sales branches and offices (MSBOs), were up 2.9 percent to \$2,873.1 billion in 2019 from a revised \$2,793.0 billion in 2018 (Figure 1). Total sales were \$8,633.5 billion in 2019. This was not significantly different from a revised total sales estimate of \$8,633.6 billion in 2018. E-commerce sales of merchant wholesalers, including MSBOs, were 33.3 percent of total sales in 2019, up from a revised 32.4 percent in 2018 (Figure 2).

E-commerce sales accounted for 29.1 percent of total sales of merchant wholesalers, excluding MSBOs, in 2019, while e-commerce sales were 43.3 percent of the sales of MSBOs.

More information is available from Table 2 U.S. Merchant Wholesale Trade Sales, Including Manufacturers' Sales Branches and Offices—Total and E-Commerce: 2019 and 2018; Table 2.1 U.S. Merchant Wholesale Trade Sales, Excluding Manufacturers' Sales Branches and Offices—Total and E-Commerce: 2019 and 2018; and Table 2.2 U.S. Manufacturers' Sales Branches and Offices Sales—Total and E-Commerce: 2019 and 2018.

EXPLANATORY NOTES

General

The estimates in this release are based on the data collected by the Census Bureau for the following four surveys: the 2019 Annual Survey of Manufactures (ASM), the 2019 Service Annual Survey (SAS), the 2019 Annual Retail Trade Survey (ARTS), and the 2019 Annual Wholesale Trade Survey (AWTS). All of these surveys were conducted independently.

Measures of total economic activity and e-commerce are presented in this report to provide a broad perspective of e-commerce activity across the many sectors. Brief descriptions of the survey methods are given below.

Industry classifications used in this report are based on the NAICS. Information about the NAICS and

additional detail about coverage, sample design, and estimation methodology for the annual surveys may be found at <www.census.gov/programs-surveys/e-stats.html>. In addition, all current and prior reports, historical data tables, and past research papers are available at this same Web site.

Measures of Economic Activity

ASM. “Value of shipments” is the measure used for manufacturing in the ASM. It is the value of all products shipped. Value of shipments includes shipments to outside customers as well as to affiliated establishments.

E-commerce shipments (e-shipments) are online orders accepted for manufactured products from customers, including shipments to other domestic establishments of the same company for further manufacture, assembly, or fabrication where price and terms of sale are negotiated over the Internet, Extranet, Electronic Data Interchange (EDI) network, e-mail, or other online system. Payment may or may not be made online.

SAS. “Revenues” is the measure used in SAS. Revenues are the dollar value of transactions and contracts between reporting firms and their customers. These values include services performed for foreign affiliates, but exclude transactions among domestic affiliates. Revenues include the total value of service contracts, the market value of compensation received in lieu of cash, amounts received for work subcontracted to others, and other industry-specific items.

Revenues from electronic sources include revenues from customers entering orders directly on a firm’s Web site or mobile application, revenues from customers entering orders directly on third-party Web sites or mobile applications, and revenues from customers entering orders via any other electronic system (such as private networks, dedicated lines, kiosks, etc.).

Beginning with the 2017 Service Annual Survey, *Revenues From Electronic Sources* replaced the e-commerce question of previous survey years. Therefore, historical data tables reflect data from the discontinued e-commerce data series. More information on this change and why it was implemented is available at <www.census.gov/programs-surveys/sas/newsroom/updates/new-data-series-for-revenue-from-electronic-sources-to-replace-e.html>.

AWTS and ARTS. “Sales” is the measure used in AWTS and ARTS. Sales are the dollar value of transactions between the reporting firm and its customers. Sales include transactions to foreign affiliates, but exclude transactions among domestic affiliates.

E-commerce sales/revenues are sales of goods and services where the buyer places an order, or the price and terms of the sale are negotiated, over the Internet, mobile device (m-commerce), Extranet, EDI network, e-mail, or other comparable online system. Payment may or may not be made online.

SURVEY METHODS

Annual Survey of Manufactures

The 2019 estimates of manufacturing shipments and e-shipments were derived from the 2019 ASM. The ASM is a survey of manufacturing establishments and represents activities at individual establishments rather than the entire company. In the ASM, data are collected annually from a probability sample of approximately 50,000 manufacturing plants. Data for small- and medium-sized single establishment companies are estimated using information obtained from administrative sources.

E-commerce questions were included on the ASM questionnaires along with questions about employment, payroll, value of shipments, cost of materials consumed, capital expenditures, and other items. Data for nonresponding plants were imputed using information from responding plants with similar characteristics.

Shipments estimates for the NAICS subsectors were calculated by summing both the reported and the imputed plant data. For the ASM, the data were weighted by the reciprocal of the probability of the plant’s inclusion in the sample. The total shipment estimates were then linked to the 2017 Economic Census results to reduce sampling and nonsampling errors.

More information on the ASM is available at <www.census.gov/programs-surveys/asm.html>.

More information on the Economic Census—Manufacturing is available at <www.census.gov/programs-surveys/economic-census.html>.

Service Annual Survey, Annual Retail Trade Survey, Annual Wholesale Trade Survey

The SAS measures the economic activity of employer firms classified in 12 service-related sectors as defined by the 2012 NAICS:

- Utilities.
- Transportation and Warehousing.
- Information.
- Finance and Insurance.
- Real Estate and Rental and Leasing.
- Professional, Scientific, and Technical Services.
- Administrative and Support and Waste Management and Remediation Services.
- Educational Services.
- Health Care and Social Assistance.
- Arts, Entertainment, and Recreation.
- Accommodation and Food Services.
- Other Services (except Public Administration).

Data are requested annually from a sample of approximately 78,000 firms.

More information about SAS is available at www.census.gov/programs-surveys/sas.html.

The ARTS measures the economic activity of employer and nonemployer (i.e., businesses without paid employees) firms classified in Retail Trade as defined by the 2012 NAICS. The sample contains approximately 16,500 firms with paid employees.

Data for nonemployers are included in the estimates through imputation or administrative data provided by other federal agencies.

More information about ARTS is available at www.census.gov/programs-surveys/arts.html.

The AWTS measures the economic activity of merchant wholesale firms with paid employees (i.e., employer firms), including MSBOs, as defined by the 2012 NAICS. Merchant wholesale firms are those that take title to the goods they sell. Data are requested annually from approximately 6,700 merchant firms (excluding MSBOs) and 1,000 MSBOs.

More information about AWTS is available at www.census.gov/programs-surveys/awts.html.

For these three surveys, stratified random samples of firms are selected from a sampling frame constructed using information from the 2012 Economic Census and updated with information from the Census Bureau's Business Register. The samples are subsequently updated to represent employer firms in business during 2019.

All service, retail, and wholesale firms surveyed are asked to report total sales/revenues and e-sales/e-revenues for 2019. Wholesalers are also asked to report e-sales made through EDI networks. Retailers in the Electronic Shopping and Mail-Order Houses industry are also asked to report total sales and e-sales for 2019 for specific merchandise lines.

E-commerce data for nonresponding employer firms and all retail nonemployers were imputed from responding firms within the same kind of business.

Estimates of total sales/revenues and e-sales/e-revenues were calculated by summing data (both reported and imputed) weighted by the reciprocal of the probability of the firm's inclusion in the appropriate sample. The services, retail, and wholesale estimates in this report have been adjusted using results of the 2017 Economic Census to reduce sampling error and to allow comparability with the census results.

Reliability of Estimates

The estimates in this report are based on sample surveys and are subject to sampling error and nonsampling error. Sampling error occurs because only a subset of the entire population is measured. Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate and may occur in censuses.

Disclosure Avoidance

Disclosure is the release of data that reveals information or permits deduction of information about a particular survey unit through the release of either tables or microdata. Disclosure avoidance is the process used to protect each survey unit's identity and data from disclosure. Using disclosure avoidance procedures, the Census Bureau modifies or removes the characteristics that put information at risk of

disclosure. Although it may appear that a table shows information about a specific survey unit, the Census Bureau has taken steps to disguise or suppress a unit's data that may be "at risk" of disclosure while making sure the results are still useful.¹

Sampling Error

Two measures of sampling error are provided for data in this report—standard errors for estimates of percentages and coefficients of variation for estimates of total dollar value. Tables are available at <www.census.gov/data/tables/2019/econ/e-stats/2019-e-stats.html>. The standard error measures the extent to which estimates derived from all possible samples of the same size drawn using the same design differ from the average of these estimates. The coefficient of variation (expressed as a percentage) is the standard error of the estimate divided by the estimate. Note that standard errors and coefficients of variation are estimates derived from the sample and are also subject to sampling error. The coefficients of variation and standard errors presented in the tables may be used to compute confidence intervals about the sample estimates.

The particular sample used for each survey included in this report is one of a large number of samples of the same size that could have been selected using the same design. For ASM, we estimate sampling variances using the Poisson variance estimator rather than the method of random groups. In about 9 out of 10 (90 percent) of the possible samples, the estimates would differ from the results of a complete enumeration by less than 1.645 times the estimated standard error. For AWTS, ARTS, and SAS, we use the method of random groups (G=16 random groups) to estimate sampling variances for estimates produced from these samples. In about 9 out of 10 (90 percent) of the possible samples, the estimates would differ from the results of a complete enumeration by less than 1.753 (a t-statistic with 15 [G-1] degrees of freedom) times the estimated standard error.

To compute a 90 percent confidence interval for an estimated total, multiply the estimate by its coefficient of variation and then by either 1.753 or 1.645, as indicated above. This amount is then

added to and subtracted from the estimate to give the upper and lower bounds of the interval. As an example, suppose the estimated total revenue is \$51,770 million and the estimated coefficient of variation for this estimate is 1.3 percent (0.013). Multiplying \$51,770 million by 0.013 and by 1.753 gives \$1,180 million. Subtracting \$1,180 million from and adding \$1,180 million to \$51,770 million gives a 90 percent confidence interval of \$50,590 million to \$52,950 million. Confidence statements for estimated percentages are computed in a similar manner. The Census Bureau recommends that individuals using estimates in this report incorporate this information into their analyses, as sampling error could affect the conclusions drawn from these estimates. All comparative statements in this report have undergone statistical testing and, unless otherwise noted, comparisons are statistically significant at the 90 percent confidence level.

Nonsampling Error

One source of nonsampling error is the inability to obtain response for all cases in the sample. One measure of this type of nonsampling error is response rates.

Economic surveys at the Census Bureau are required to compute two different types of response rates: a unit response rate and weighted item response rates. Refer to each survey's Web site (links provided previously) for the unit response rates of the surveys that contribute to this report. The weighted item response rates are called Total Quantity Response Rates (TQRR) and are item-level indicators of the quality of each estimate. The following table shows the TQRRs for e-commerce activity for the sectors included in this report. More detailed information about calculating and reporting response rates for economic surveys is available at <www.census.gov/about/policies/quality/standards/appendixd3b.html>.

Other sources of nonsampling errors include response errors, unclear definitions, differences in the interpretation of questions, mistakes in recording or coding the data obtained, and other errors of collection, response, coverage, and estimation of missing data. Although no direct measures of these sources of nonsampling error have been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

¹ The Census Bureau has reviewed the data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied.
ASM Approval ID: CBDRB-FY21-107
SAS: Approval ID: CBDRB-FY20-286, CBDRB-FY21-133
ARTS Approval ID: CBDRB-FY21-097
AWTS Approval ID: CBDRB-FY21-080

Total Quantity Response Rates for 2019 Total Shipments/Sales/Revenues and E-Commerce

Sector	Total sales	E-commerce sales
Manufacturing	58.0	55.0
Services	84.0	76.8
Retail	89.7	83.6
Merchant wholesale ¹ . . .	86.1	51.9

¹ Total merchant wholesale trade including manufacturers' sales branches and offices.

CONTACTS

For additional information regarding surveys included in this report, and for general information about the Census Bureau's e-commerce measurement program, contact:

Data User and Trade Outreach
<emd.outreach@census.gov>
800-242-2184

Future E-Stats Related Releases

- 2020 Service Annual Survey: 4th Quarter 2021
- 2020 Annual Wholesale Trade Survey: 4th Quarter 2021
- 2020 Annual Survey of Manufactures: 1st Quarter 2022
- 2020 Annual Retail Trade Survey: 1st Quarter 2022
- 2020 Supplemental E-Commerce: 1st Quarter 2022

All E-Stats reports, including prior reports, historical data tables, and past research papers, are available at <www.census.gov/programs-surveys/e-stats.html>.