



E-Stats

E-commerce 2000

This latest edition of *E-Stats* provides a snapshot of e-commerce activity for key sectors of the U.S. economy for 2000 and revises previously released data for 1999. The data are collected from over 125,000 manufacturing, wholesale, services, and retail businesses.

E-commerce highlights in 2000 include:

- Business-to-business (B-to-B) e-commerce dominates.
- E-commerce grew in all sectors.
- E-commerce is pervasive among the industry groups in each sector.
- The dollar value of e-commerce in each sector is concentrated in a handful of industry groups.
- Electronic Data Interchange (EDI) plays a critical role in supporting B-to-B e-commerce.

Note to readers

E-commerce data were collected in four separate Census Bureau surveys. These surveys use different measures of economic activity such as value of shipments for manufacturing, sales for wholesale and retail trade, and revenues for service industries. Consequently, measures of total economic and e-commerce activity differ in concept and definition among these sectors, and should be added together with caution. The Census Bureau's e-commerce measures report the value of goods and services sold online whether over open networks such as the Internet, or over proprietary networks running systems such as Electronic Data Interchange (EDI).

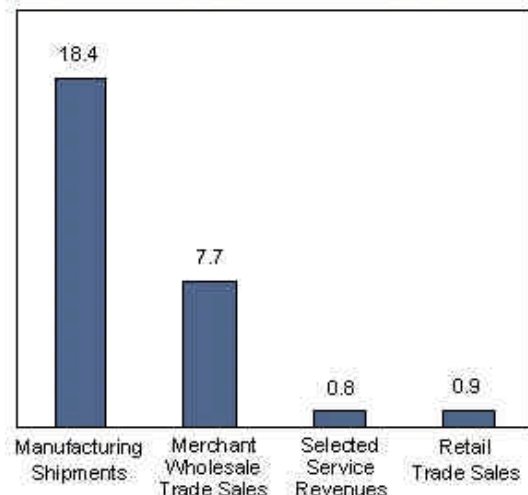
This report covers North American Industry Classification System (NAICS) industries that accounted for approximately 70 percent of the U.S. economic activity measured in the 1997 Economic Census. The report does not cover agriculture, mining, utilities, construction, nonmerchant wholesalers, and approximately one-third of service-related industries. See **Explanatory Notes** for additional information regarding report coverage, methods, and data reliability. Measures of sampling variability for Tables 1-6 are presented in Tables 1A-6A and follow the Explanatory Notes.

This edition of *E-Stats* revises 1999 data released in March 2001. See **Explanatory Notes** for additional information on the revisions. All reported changes between 1999 and 2000 reflect revised data for 1999.

The dollar value of e-commerce and the e-commerce share of economic activity vary markedly among key economic sectors.

- Manufacturing leads all industry sectors with e-commerce shipments that account for 18.4 percent (\$777 billion) of the total value of manufacturing shipments.
- Merchant Wholesalers rank second with e-commerce sales that represent 7.7 percent (\$213 billion) of their total sales.
- E-commerce revenues for the special grouping of service industries created for the *E-Stats* reports, Selected Service Industries, accounted for 0.8 percent (\$37 billion) of total revenues for these industries.
- Retail Trade, the focus of much e-commerce attention, has e-commerce sales in 2000 that account for 0.9 percent (\$29 billion) of total retail sales.

E-Commerce as Percent of Total Value: 2000



B-to-B E-commerce

In 2000, 94 percent of e-commerce is B-to-B. While the surveys do not collect separate data on business-to-business (B-to-B) and business-to-consumer (B-to-C) e-commerce, *E-Stats* shows that e-commerce represents a much larger share

of total economic activity in sectors that sell primarily to other businesses. We estimate a B-to-B share by making several simplifying assumptions and ignoring the definitional differences between shipments, sales, and revenues. We assume manufacturing and wholesale e-commerce is entirely B-to-B and that retail and service e-commerce activity is entirely B-to-C. The resulting B-to-B estimate, while not directly measured, shows, in terms of dollar volume, almost all e-commerce activity involves transactions between businesses.

Importance of EDI Networks. The dominant position of B-to-B e-commerce also reflects the long-standing use of EDI in manufacturing and wholesale trade. EDI is the exchange of computer processable data in a standard format between organizational entities. There are two EDI standards. The Accredited Standards Committee X12 is the standard in North America, while UN/EDIFACT is the standard for Europe and most of Asia. The format and the data associated with any particular EDI transaction are defined in the X12 or EDIFACT EDI standards. While EDI transactions often are conducted over Value Added Networks, they also can be transmitted over open networks.

EDI sales are separately identified for the first time in the 2000 Annual Trade Survey. E-commerce sales by merchant wholesalers are overwhelmingly conducted over EDI networks. In fact, EDI sales for merchant wholesalers total \$188 billion and account for 88 percent of their e-commerce sales.

The importance of EDI in merchant wholesale is consistent with EDI use in manufacturing as reported in the March and June 2001 editions of *E-Stats*. Manufacturing plants primarily using EDI networks for accepting online orders accounted for two-thirds of e-commerce shipments of responding plants in mid-2000 while plants primarily using Internet networks accounted for only 5 percent of e-commerce shipments.

Manufacturing

The value of U.S. manufacturing e-commerce shipments (e-shipments)

reached \$777 billion in 2000, an increase of 7 percent over revised 1999 e-shipments of \$730 billion. E-shipments, as shown in Table 1, account for 18.4 percent of the value of all shipments from U.S. manufacturing plants in 2000, about the same as in 1999. This information was collected in the 2000 Annual Survey of Manufactures (ASM) Computer Network Use Supplement, a separate survey of more than 50,000 ASM manufacturing plants.

Manufacturing e-shipments are concentrated. The five industry groups with the highest shares of e-shipments account for 67 percent of all manufacturing e-shipments in 2000, almost identical to 1999.

Transportation Equipment is the largest industry group, accounting for 38 percent (\$294 billion) of total manufacturing e-shipments. The large e-shipments share for Transportation Equipment is consistent with the substantial role that group plays in Manufacturing, where it accounts for 15 percent of total shipments. It also is consistent with the long history of EDI use in this group.



E-shipments are pervasive in manufacturing, accounting for at least 10 percent of shipments in 16 of 21 industry groups. The e-shipments share of total shipments is largest in Transportation Equipment (46 percent), followed by Beverage & Tobacco (38 percent) and Electrical Equipment, Appliances, and Components (24 percent).

Merchant Wholesale Trade

U.S. merchant wholesale e-commerce sales (e-sales) reached \$213 billion in 2000, an increase of 17 percent more than 1999 e-sales of \$183 billion. E-sales, as shown in Table 2, represent 7.7 percent of total merchant wholesale sales in 2000, up from 7.2 percent in 1999.

This information was collected in the 2000 Annual Trade Survey, a survey of more than 6,900 merchant wholesalers that take title to

the goods they sell. Table 2 therefore excludes nonmerchant wholesalers such as manufacturers' sales branches and offices, agents, brokers, commission agents, and electronic marketplaces and exchanges. In the 1997 Economic Census, nonmerchant wholesalers accounted for approximately 43 percent of total wholesale trade sales.

E-sales are concentrated, with nearly 63 percent of total e-sales by merchant wholesalers occurring in three industry groups. Drugs and Druggists' Sundries wholesalers account for 31 percent (\$66 billion); Motor Vehicles, Parts and Supplies wholesalers, 19 percent (\$40 billion); and Professional and Commercial Equipment and Supplies wholesalers, 13 percent (\$28 billion). These same industry groups account for about 62 percent of e-sales by merchant wholesalers in 1999.

While all merchant wholesale industry groups have some e-sales, only three industries or industry groups sell more than 10 percent of their merchandise over online networks. Drugs and Druggists' Sundries wholesalers' e-sales are 40 percent of their total sales, Motor Vehicles, Parts and Supplies wholesalers' e-sales represent 20 percent of their total sales, and Computer Equipment and Supplies wholesalers' e-sales account for 11 percent of total sales.

Importance of EDI Networks for Merchant Wholesalers. Merchant Wholesalers achieve e-sales, as Table 3 shows, primarily through EDI networks. All merchant wholesale industry groups use EDI networks, and almost all of the 18 industry groups generate more than two-thirds of their e-sales through EDI networks.

Selected Service Industries

U.S. e-commerce revenues (e-revenues) for selected service industries reached \$37 billion in 2000, an increase of 48 percent from 1999 e-revenues of \$25 billion. E-revenues, as shown in Table 4, account for 0.8 percent of total revenues in these sectors in 2000, up from 0.6 percent in 1999.

Four groups account for 55 percent of total Selected Service e-revenues. Travel Arrangement and Reservation Services account for 17 percent of total Selected Service e-revenues, and Securities and Commodity Contracts Intermediation and Brokerage represent 15 percent of the total. Publishing, including newspaper, periodical, book, and software publishers, accounts for an additional 13 percent. Computer Systems Design and Related Services are 10 percent of total e-revenues.

The e-revenues share of total revenue is largest in Travel Arrangement and Reservation Services, accounting for 24 percent of the total revenue for this industry group. Online Information Services and Couriers and Messengers are the only other selected service industry groups where e-revenues represent more than 3 percent of total revenues.



The Selected Service Industries total provided in Table 4 is not an official NAICS grouping, but rather the sum of the bolded groups shown in the table. Some of these groups are not complete. Incomplete industry coverage within a group is denoted by the absence of a NAICS Code for a Table 4 bolded row and the use of "Selected" in the group description. Table 4 covers about two-thirds of the NAICS service-related industries included in the 1997 Economic Census and 55 percent of their total revenues.

Retail Trade

U.S. retail e-commerce sales (e-sales) reached \$29 billion in 2000, an increase of 92 percent more than 1999 e-sales of \$15 billion. Retail e-sales, as shown in Table 5, account for 0.9 percent of total retail sales in 2000, up from 0.5 percent in 1999. This information is collected in the 2000 Annual Retail Trade Survey, a survey of more than 19,000 retailers.

E-sales are concentrated in two groups that account for 91 percent of retail e-sales: Nonstore Retailers and Motor Vehicle and

Parts Dealers. Nonstore Retailers include catalog and mail-order operations as well as retail sites selling solely over the Internet and account for 75 percent (\$22 billion) of retail e-sales. Motor Vehicles and Parts Dealers are the next largest with 16 percent (\$5 billion) of total retail e-sales.



The Electronic Shopping and Mail-Order Houses industry accounts for almost all of Nonstore Retailers e-sales. This industry includes

catalog and mail-order operations, many of which sell through multiple channels, and "pure plays," retail businesses selling solely over the Internet. In addition, this industry includes e-commerce business units of "brick and click" retailers, if the e-commerce group operates as a separate unit and is not engaged in the online selling of motor vehicles. The decision rules used to determine what to include in the Electronic Shopping and Mail-Order industry results in almost all the sales and e-sales of "brick and click" retailers being included in this industry which, in turn, reduces the e-sales shown in other retail groups. The exception to this rule is the online sales of motor vehicles. The online sales of "brick and click" vehicle dealers are shown in the Motor Vehicles and Automotive Equipment group. This exception reflects the continued importance of the dealership in actually closing the online deal and delivering the vehicle.

Table 6 provides detailed information on the kinds of merchandise sold by businesses classified in the Electronic Shopping and Mail-Order Houses industry. The leading merchandise category within this industry is Computer Hardware with e-sales of \$6 billion, followed by Books and Magazines with \$2 billion e-sales and Clothing and Clothing Accessories (including footwear) with \$2 billion in e-sales.

Within the Electronic Shopping and Mail-Order Houses industry, e-sales grew faster than sales made through traditional channels e.g., catalogs or over the telephone. For the Electronic Shopping and

Mail-Order Houses industry, e-sales accounted for 20 percent of all sales in 2000, compared to only 13 percent in 1999. Merchandise categories with the highest percent of online sales include Books and Magazines with 49 percent of total sales sold online, and Electronics and Appliances, and Computer Software, both with e-sales accounting for 31 percent of total sales.

Note

More recent data on e-sales for retail trade are available as part of the ongoing quarterly retail e-commerce series. Data for 4th quarter 2001 and the preliminary estimate for the year 2001 were released on February 20, 2002.

U.S. retail e-sales were \$10 billion in the fourth quarter of 2001 and accounted for 1.2 percent of total retail sales (\$861 billion) in that quarter. The preliminary estimate of total e-sales for 2001 is \$33 billion, accounting for 1 percent of total retail sales for 2001.

Explanatory Notes

General

The e-commerce estimates in this release are based on data collected from four surveys conducted by the U.S. Census Bureau: the 2000 Annual Survey of Manufactures (ASM) Computer Network Use Supplement, the 2000 Annual Trade Survey (ATS), the 2000 Service Annual Survey (SAS) and the 2000 Annual Retail Trade Survey (ARTS). 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 four sectors. Brief descriptions of the survey methods are given below. Industry classifications used in this report are based on the North American Industry Classification System (NAICS). Information about NAICS and additional detail about coverage, sample design and estimation methodology for the annual surveys may be found online at www.census.gov/estats.

Definitions of Economic Activity

The four surveys use different measures of economic activity.

ASM. Value of Shipments is the measure used in the ASM. It is the market value of all commodities shipped from a plant. Value of shipments includes shipments to outside customers as well as to affiliated plants.

ATS and ARTS. Sales is the measure used in the ATS and the 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.

SAS. Revenue is the measure used in the SAS. Revenues are the dollar values of transactions and contracts between the reporting firm and its customers. These values include services performed for foreign affiliates, but exclude transactions among domestic affiliates. Revenue includes 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.

Survey Methods

Annual Survey of Manufactures Computer Network Use Supplement.

The ASM is designed to produce estimates for the manufacturing sector of the economy. The manufacturing universe is comprised of approximately 380,000 plants. Data are collected annually from a probability sample of approximately 50,000 of the 200,000 manufacturing plants with five or more employees. Data for the remaining 180,000 plants with less than five employees are estimated using information obtained from administrative sources.

In July 2001, plants included in the ASM sample were contacted via mail and requested to

complete the
*2000 Annual
Survey of
Manufactures
Computer
Network Use*



Supplement on the Census Bureau's website. Reporting via the traditional paper format was also permitted. This supplement collected information about the plant's

e-commerce activities. The questionnaire asked if the plant accepted online orders from customers and the dollar volume or the percentage of total shipments that was ordered online. Information on online purchases also were requested.

E-commerce data for nonresponding plants were imputed using information from responding plants with similar characteristics.

Estimates for the NAICS subsectors were calculated by summing both the reported and the imputed plant data. For each plant the online data was weighted by the reciprocal of the probability of the plant's inclusion in the ASM sample. These estimates were then linked to the 1997 Economic Census results to reduce sampling and non-sampling errors.

The 1999 e-shipments data included in this report are revised significantly upward from those originally published in the March 2001 edition of *E-Stats*. There are two main reasons for the 1999 revisions. Data collection procedures for the 2000 survey were changed and 1999 nonrespondents were re-imputed.

For the 1999 survey we directed our survey to the plant manager because we were requesting detailed information about the individual plant's use of numerous e-business processes. We also asked the plant manager to report their e-commerce shipments as a percent of total shipments.

For the 2000 survey we directed our survey request to the ASM contact, typically someone in the accounting department, not the plant manager since we did not collect any e-business process use information. We also changed the form and gave the respondent the option of reporting e-shipments as a dollar value or as percent of total shipments.

Changes in data collection procedures did result in some inconsistency in reporting between years. Some plants reported large e-shipments in 2000, but zero in 1999. Others reported zero in 2000 and large shipments in 1999. To resolve significant reporting inconsistencies we contacted

nearly 400 plants and corrected both 2000 and 1999 e-shipments reported figures. These corrections revised the original 1999 e-shipments estimate upwards by almost \$125 billion.

For this edition of *E-Stats* we re-imputed the 1999 nonrespondents based on the characteristics of the 1999 respondents, rather than using the nonresponse weight adjustment method used in last year's report. The 1999 respondents data file reflected the 1999 corrections made as a result of this year's follow up telephone calls, so the response data were substantially higher than the response base used in last year's imputation. The revised imputation resulted in additional upward revision of \$119 billion.

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

The ATS measures the economic activity of merchant wholesale firms with paid employees. Merchant wholesale firms are those that take title to the goods they sell. Data are collected annually from more than 6,900 firms that represent the universe of approximately 300,000 merchant wholesale firms with paid employees.

The SAS measures activity of employer firms classified in ten service-related sectors: Transportation and Warehousing; Information; Finance; Rental and Leasing; Professional, Scientific, and Technical Services; Administration and Support and Waste Management and Remediation Services; Health Care and Social Assistance; Arts, Entertainment and Recreation; Accommodation and Food Services; and Other Services. Data are collected annually from more than 51,000 firms representing the universe of more than 2.9 million establishments with paid employees.

The ARTS measures the economic activity of all retailers with and without paid employees. The ARTS collects data annually from more than 19,000 firms with paid employees. Sales for firms without paid employees are estimated using administrative records. The Retail Trade universe contains over 2.5 million firms.

For these three surveys, stratified random samples of firms were drawn from a sampling frame constructed using information from the 1997 Economic Census and updated with information from the Census Bureau's Business Register. The samples were subsequently updated to represent employer firms in business during 2000.

All wholesale, service, and retail firms mailed in the surveys were asked to report total and e-sales/e-revenue for 2000. Wholesalers were asked to report e-sales made through EDI networks. Retailers in the Electronic Shopping and Mail-Order Houses industry were also asked to report total sales and e-sales for 2000 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 and sales size category.

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 estimates in this report have been linked to the 1997 Economic Census to reduce sampling error and to allow comparability with the census results.

The data for 1999 included in this report are revised from those originally published in the March 2001 edition of *E-Stats*. For retail and selected services, the revisions were modest and were primarily the result of respondents correcting data for 1999.

For merchant wholesalers, the original 1999 e-sales estimate was revised up by \$48 billion. The revision was a result of corrections made by respondents. We changed the 2000 report form and these changes led to revisions to 1999 data. Based on the 2000 survey results it was clear that there was a misinterpretation of the instructions in 1999. Specifically, in 1999 a number of respondents did not recognize that sales via EDI should be included in e-sales even though EDI was listed in the instructions. For 2000, we asked respondents a new question on

whether they sold via EDI and if so, what was the corresponding sales volume. This new question helps highlight that EDI should be included in e-sales. We also found a number of respondents that reported large amounts of EDI in 2000 but no EDI in 1999. We contacted these respondents to determine if there should have been EDI sales in 1999. This also resulted in an upward revision in the 1999 e-commerce estimate.

Reliability of Estimates

The estimates in this release are based on sample surveys and are subject to sampling and nonsampling errors. 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 also occur in censuses. Changes in data methods, report forms, and imputation methods all can affect the nonsampling error.

Tables 1A through 6A show standard errors for estimates of percentages and coefficients of variation for estimates of level. The standard error measures the extent to which estimates derived from all possible samples drawn using the same design differs from the average of these estimates. The coefficient of variation (expressed as a percentage) is the standard error of the estimate in units 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 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. In about 9 out of 10 (90 percent) of these possible samples, the estimates would differ from the results of a complete enumeration by less than 1.645 times the percentage shown.

To compute a 90-percent confidence interval for an estimate of level, multiply the estimate

by its coefficient of variation and then by 1.645. This amount is then added to and subtracted from the estimate to give the upper and lower bounds of the interval. As an example, the estimated total value of shipments from Textile Mills (Table 1, NAICS code 313) 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 then by 1.645 gives \$1,107 million. Subtracting \$1,107 from and adding \$1,107 to \$51,770 million gives a 90-percent confidence interval of \$50,663 million to \$52,877 million. Confidence statements for estimated percentages are computed in a similar manner.

One source of nonsampling error is the inability to obtain information about all cases in the samples. Response rates for each survey are given in the following table.

Percentage of Total and E-Commerce Sales Estimated from Reported Data

Survey	Total sales	E-commerce Sales
ASM	88.6	78.0
ATS	90.5	89.4
ARTS	91.9	85.7
SAS	88.0	81.0

Other sources of nonsampling error 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.

E-Stats Reports

All *E-Stats* reports are available at www.census.gov/estats.

Future Reports

- Quarterly retail e-commerce data will be released in May, August, and November 2002.
- *E-Stats* 2001 will be released in Spring 2003.

Prior Reports and Research Papers

All prior reports, and current and past research papers, are available at www.census.gov/estats.

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The Census Bureau is committed to providing the business community and policymakers with more relevant and useful economic statistics. We thank all the businesses that participated in these surveys. Their cooperation and continued participation is vital to the future success of the economic statistics programs.

