

E-commerce 1999

Census Bureau data show that business to business (B-to-B) e-commerce dominated 1999 e-commerce activity. *E-Stats* provides the first official snapshot of e-commerce activity for key sectors of the U.S. economy. This report shows that while e-commerce in 1999 accounted for a relatively small percent of total economic activity in these sectors, e-commerce transactions between businesses, commonly referred to as B-to-B

Note to readers

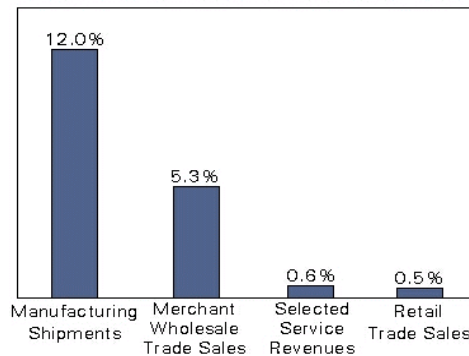
E-commerce data were collected in four separate Census Bureau surveys. These surveys used different measures of economic activity such as shipments for manufacturing, sales for wholesale and retail trade, and revenues for service industries. Consequently, measures of total economic and e-commerce activity vary by economic sector, are conceptually and definitionally different, and therefore, are not additive. 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).

Although *E-Stats* does not cover the entire U.S. economy, this report covers North American Industry Classification System (NAICS) industries that accounted for approximately 70 percent of 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. The measures of sampling variability for Tables 1-5 follow the Explanatory Notes and are found in Tables 1A-5A.

e-commerce, accounted for a remarkably large share of overall e-commerce. The report also shows that the dollar value of e-commerce activity varied significantly among key sectors of the economy. Within these sectors, however, almost all industry groups were engaged in e-commerce to some degree, but a significant portion of the total e-commerce dollar value was concentrated in a handful of industry groups.

Manufacturing led all industry sectors with 1999 e-commerce shipments that accounted for 12.0 percent (\$485 billion) of the total value of manufacturing shipments. Merchant Wholesalers were second with e-commerce sales that represented 5.3 percent (\$134 billion) of total sales. A special grouping of service industries created for this report shows that Selected Service Industries e-commerce revenues accounted for 0.6 percent (\$25 billion) of total revenues for these industries. Retail Trade, the focus of much e-commerce attention, had e-commerce sales in 1999 that accounted

E-Commerce as Percent of Total Value: 1999



for 0.5 percent (\$15 billion) of total retail sales.

Manufacturing and Merchant Wholesale Trade, sectors where goods are primarily sold to other businesses, had substantially higher e-commerce percentages than Retail Trade and Selected Service Industries, sectors where goods and services are sold to individual consumers as well as to businesses. Although the surveys did not collect separate data on business to business (B-to-B) and business to consumer (B-to-C) e-commerce, one can approximate relative shares by using some simplifying assumptions. If one assumes all manufacturing and wholesale e-commerce was entirely B-to-B and all retail and service e-commerce activity was entirely B-to-C, and ignores the definitional differences between shipments, sales, and revenue, more than 90 percent of total e-commerce was B-to-B.

One possible explanation for the large e-commerce percent differences among the four sectors may be the long-standing use of EDI systems for online selling by many manufacturing and wholesale trade industries in contrast to the much more recent adoption of Internet systems by many retail and service industries. In manufacturing, while many plants used the Internet for accepting online orders from their customers, in terms of dollar volume, EDI systems continued to dominate. Of those manufacturing plants that reported offering online ordering to their customers, 52 percent used the Internet most frequently for accepting online orders, while 36 percent used EDI most often. However, in terms of dollar value, plants using Internet ordering systems most frequently accounted for only 5 percent of total manufacturing e-commerce shipments while plants offering EDI online ordering accounted for 59 percent.

The *E-Stats* tables show that almost all industry groups are engaged in e-commerce activity to some degree, but that in terms of dollar value, e-commerce is concentrated in a few groups within each sector. For example, in Merchant Wholesale Trade three industry groups accounted for 76 percent of wholesale e-commerce sales, while in Retail Trade one group accounted for 77 percent of retail e-commerce sales.

Manufacturing

U.S. manufacturing e-commerce shipments, as shown in Table 1, accounted for 12.0 percent (\$485 billion) of the value of all shipments (\$4,038 billion) from U.S. manufacturing plants. This information was collected in the 1999 Annual Survey of Manufactures (ASM) Computer Network Use Supplement, a separate survey of more than 50,000 ASM manufacturing plants.

Manufacturing e-commerce shipments were concentrated in five industry groups that accounted for 63 percent of all manufacturing e-commerce shipments in terms of dollar value. Transportation Equipment was largest, accounting for 29 percent (\$140 billion) of total manufacturing e-commerce shipments. Substantial e-commerce shipments also were found in Food Products, Chemicals, Machinery, and Computer and Electronic Products manufacturing groups.

Every manufacturing group was engaged in e-commerce activity and, in fact, there were only two groups - Wood Products, and Petroleum and Coal Products - where e-commerce shipments accounted for less than 5 percent of total shipments for the group. While Transportation Equipment



accounted for the largest percentage of group shipments (21 percent), other groups with large percentages of e-commerce shipments included Electrical Equipment, Appliances, and Components (20 percent); Apparel (18 percent); Leather and Allied Products (18 percent); and Textile Product Mills (15 percent).

Merchant Wholesale Trade

U.S. merchant wholesale e-commerce sales, as shown in Table 2, were 5.3 percent (\$134 billion) of total sales (\$2,541 billion) for 1999. This information was collected in the 1999 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 44 percent of total wholesale trade sales.

E-commerce sales were concentrated in three industry groups that accounted for more than 75 percent of total e-commerce sales by merchant wholesalers. Drugs and Druggists' Sundries wholesalers accounted for 35 percent (\$47 billion); Motor Vehicles, Parts and Supplies wholesalers, 25 percent (\$33 billion); and Professional and Commercial Equipment and Supplies wholesalers, 16 percent (\$22 billion).

While all merchant wholesale industry groups had some e-commerce sales, only two industry groups sold more than 10 percent of their merchandise over online networks. Drugs and Druggists' Sundries wholesalers' e-commerce sales were

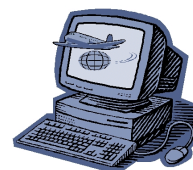


almost one-third of their total sales and Motor Vehicles, Parts and Supplies wholesalers' e-commerce sales were 17 percent of their total sales.

Selected Service Industries

U.S. e-commerce revenues for selected service industries, as shown in Table 3, accounted for 0.6 percent (\$25 billion) of total revenues (\$4,276 billion). This information was collected in the 1999 Service Annual Survey, a survey of 51,000 services firms. The Selected Service Industries total provided in Table 3 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 3 **bolded** row and the use of "Selected" in the group description. Table 3 includes about two-thirds of the NAICS service-related industries covered in the 1997 Economic Census and 55 percent of their total revenues.

Four groups accounted for almost 60 percent of total Selected Service e-commerce revenues. Travel Arrangement and Reservation Services accounted for 21 percent of total Selected Service e-commerce revenues, Securities and Commodity Contracts Intermediation and Brokerage represented 15 percent of the total, Publishing accounted for 12 percent of total e-commerce revenues, and Computer Systems Design and Related Services an additional 11 percent.



Travel Arrangement and Reservation Services was the online leader among all the selected service groups with

e-commerce revenue accounting for 21 percent of the total revenue for the group. Online Information Services and Couriers and Messengers, both with online revenues close to 5 percent, were the only other service groups where e-commerce revenues represented more than 2 percent of total revenues for a group.

Retail Trade

U.S. retail e-commerce sales, as shown in Table 4, accounted for 0.5 percent (\$15 billion) of total sales (\$2,868 billion). This information was collected in the 1999 Annual Retail Trade Survey, a survey of more than 19,000 retailers.

E-commerce sales were concentrated in two groups: 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 accounted for 77 percent (\$12 billion) of retail e-commerce sales. Motor Vehicles and Parts Dealers were next largest with 12 percent (\$2 billion) of total retail e-commerce sales.



Nonstore Retailers was the only retail group with e-commerce sales greater than 1 percent of their total sales. The Electronic Shopping and Mail-Order Houses industry accounted for almost all of Nonstore Retailers e-commerce sales. Table 5 provides detailed information on the kinds of merchandise sold by businesses classified in the Electronic Shopping and Mail-Order Houses industry. The leading merchandise categories within this industry were Computer Hardware with 37 percent and Books and Magazines with 14 percent

of total industry e-commerce sales. The other merchandise categories where e-commerce sales represented 5 or more percent of total industry e-commerce sales were Music & Video, Clothing, Office Equipment and Supplies, Computer Software, and Other Merchandise. For Electronic Shopping and Mail-Order Houses 45 percent of their Books and Magazines sales and 31 percent of their Computer Software total sales were sold online.

These 1999 retail trade e-commerce data are not directly comparable with the 2000 e-commerce retail trade estimates, part of the quarterly retail e-commerce series, released on February 16, 2001. See the Explanatory Notes for additional information.

Future E-Stats Reports

The 1999 Annual Trade Survey, Annual Retail Trade Survey, and the Services Annual Survey collected data for both 1998 and 1999. This report provides 1999 information. The 1998 data will be posted to www.census.gov/estats on March 13, 2001.

The 1999 Annual Survey of Manufactures (ASM) Computer Network Use Supplement collected data only on 1999 e-commerce activity. The survey collected additional information on manufacturing plants current and planned use of some 25 selected e-business processes. It also collected information regarding online sharing by plants of different types of information with vendors, customers, and other plants of the same company. Initial results highlighting the extent to which manufacturing plants are using selected e-business processes will be available in May 2001.

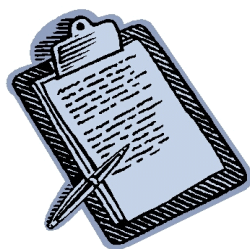
Explanatory Notes

General

The e-commerce estimates in this release are based on data collected from four surveys conducted by the U.S. Census Bureau: the 1999 Annual Survey of Manufactures (ASM) Computer Network Use Supplement, the 1999 Annual Trade Survey (ATS), the 1999 Service Annual Survey (SAS) and the 1999 Annual Retail Trade Survey (ARTS). These surveys were conducted independently to measure several important economic variables. The estimates of total and e-commerce shipments, sales, and revenues from these surveys have been consolidated to provide a broader perspective of e-commerce activity. 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). The annual surveys for wholesale, retail, and selected services published estimates on a NAICS basis for the first time effective with the 1999 reference year. Previous data releases used the Standard Industrial Classification system.

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.



U.S. retail e-commerce sales for 2000 were \$26 billion or 0.8 percent of total retail sales. These data were released on February 16, 2001 as part of the Census Bureau's quarterly retail e-commerce series. See www.census.gov/estats for the full release. The 2000 retail e-commerce estimates, however, are not directly comparable with the 1999 e-commerce estimates shown in Table 4 since the quarterly estimates are based on the old Standard Industrial Classification (SIC) system while the 1999 estimates are based on NAICS. Important differences between NAICS and the SIC include a change in the Retail Trade and Wholesale Trade boundary which shifted a significant number of businesses from Wholesale to Retail, and moved Food Services from the Retail Trade sector to the Accommodation and Food Services sector. The quarterly e-commerce series, which now uses the Standard Industrial Classification system, will begin using the NAICS system effective with the e-commerce release for the second quarter 2001, scheduled for August 2001.

Definitions of Economic Activity

The four surveys use different measures of economic activity.

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.

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

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 approximately 365,000 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 165,000 plants with less than five employees are imputed using information obtained from administrative sources.

The 1999 Annual Survey of Manufactures Computer Network Use Supplement was mailed to the plants in the ASM sample. This supplement collected information about manufacturers' e-commerce activities and use of e-business processes. The questionnaire asked if the plant allowed online ordering and the percentage of total shipments that were ordered online. Information on online purchases were also asked. In addition, information was collected about the plant's current and planned use of selected e-business processes and the extent to which the plant shared information online with vendors, customers, and other plants within the company.

Approximately 83 percent of the plants responded to this supplement. A stratified random sample of approximately 150 nonrespondents was selected. These plants were contacted by telephone to determine if they accepted online orders and to obtain

the percentage of total shipments ordered online. The information collected from this sample was weighted to represent the entire group of nonrespondents.

Estimates for NAICS subsectors were calculated from the respondents to the supplement by summing their online data weighted by the inverse of the probability of the establishment's inclusion in the ASM sample. Estimates from the supplement and the nonresponse sample were summed to represent the entire ASM sample. These estimates were then linked to the 1997 Economic Census results to reduce sampling and nonsampling error.

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 over 6,900 firms that represent the universe of approximately 300,000 merchant firms with paid employees.

The SAS measures activity of selected employer firms classified in nine 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 over 51,000 firms to represent the universe of over 2.9 million firms with paid employees. Revenue for the approximately 190,000 firms without paid employees in the Accommodation and Food Services sector are estimated from administrative records.

The ARTS measures the economic activity of all retailers with and without paid employees. The ARTS collects data annually from over 19,000 firms with paid employees. Sales for firms without paid employees are estimated from 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 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 1999.

All wholesale, service, and retail firms mailed in the surveys were asked to report total and e-commerce sales/revenue for 1999 and 1998. Retailers in the Electronic Shopping and Mail-Order Houses industry were also asked to report total and e-commerce sales for 1999 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 and e-commerce sales were calculated by summing data (both reported and imputed) weighted by the inverse 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.

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.

Tables 1A through 5A show sampling 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 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 sampling 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 \$54,854 million and the estimated coefficient of variation for this estimate is 1.2 percent (0.012). Multiplying \$54,854 million by 0.012 and then by 1.645 gives \$1,083 million.

Subtracting \$1,083 from and adding \$1,083 to \$54,854 million gives a 90-percent confidence interval of \$53,771 million to \$55,937 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	85.6	92.4
ATS	92.3	90.5
ARTS	94.3	88.4
SAS	89.1	78.0

Other sources of nonsampling error include response errors, definition difficulties, 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.

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The Census Bureau is committed to providing the business community and policymakers with more relevant and useful economic statistics. This report is an important first step in achieving that goal. 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.