

E-commerce 2001 Highlights

- E-commerce outperformed total economic activity in three of four major economic sectors measured between 2000 and 2001.
- Business-to-Business (B-to B) activity, which depends critically on Electronic Data Interchange (EDI), dominates e-commerce.
- All industry groups in each sector participate in e-commerce.
- Most e-commerce occurs in a handful of industry groups within each sector.

This latest edition of *E-Stats* provides a snapshot of e-commerce activity for key sectors of the U.S. economy for 2001 and revises previously released data for 2000. The data are collected from over 125,000 manufacturing, wholesale, services, and retail businesses.

Note to readers

E-commerce data are 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 the total should be interpreted with caution. The Census Bureau's e-commerce measures include 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).

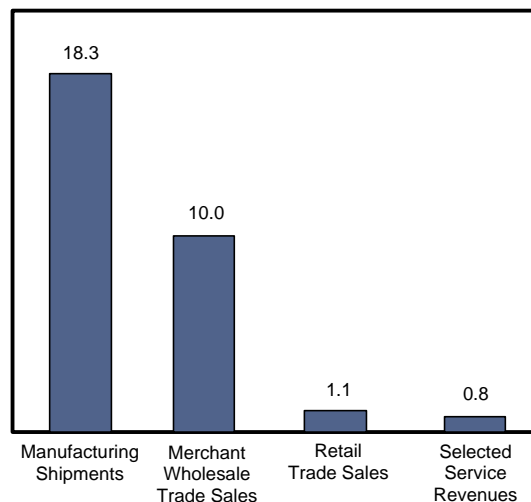
This report covers North American Industry Classification System (NAICS) industries that accounted for approximately 70 percent of the U.S. economic activity measured in the prior Economic Census. The report does not cover agriculture, mining, utilities, construction, nonmerchant wholesalers, and approximately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

This edition of *E-Stats* revises 2000 data released in March 2002. See **Explanatory Notes** for additional information on the revisions. All reported changes between 2000 and 2001 reflect revised data for 2000.

E-commerce—both its dollar value and share of economic activity—varies markedly among key economic sectors.

- Manufacturing leads all industry sectors with e-commerce shipments that account for 18.3 percent (\$725 billion) of the total value of manufacturing shipments.
- Merchant Wholesalers rank second with e-commerce sales that represent 10.0 percent (\$270 billion) of their total sales.
- Retail Trade, the focus of much e-commerce attention, has e-commerce sales in 2001 that account for 1.1 percent (\$34 billion) of total retail sales.
- E-commerce revenues for the special grouping of service industries created for the *E-Stats* reports, Selected Service Industries, account for 0.8 percent (\$37 billion) of total revenues for these industries.

E-commerce as Percent of Total Value: 2001



B-to-B and B-to-C E-commerce

In 2001, 93 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, the following table shows that

U.S. Shipments, Sales, Revenues and E-Commerce: 2001 and 2000

[Shipments, sales and revenues are in billions of dollars.]

Description	Value of Shipments, Sales, or Revenue				Y/Y Percent Change		Percent Distribution of E-commerce	
	2001		2000					
	Total	E-commerce	Total	E-commerce	Total	E-commerce	2001	2000
Total *	14,572	1,066	14,657	1,062	-0.6	0.4	100.0	100.0
B-to-B*	6,676	995	6,950	997	-3.9	-0.2	93.3	93.9
Manufacturing	3,971	725	4,209	756	-5.7	-4.1	68.0	71.2
Merchant Wholesale	2,705	270	2,741	241	-1.3	12.0	25.3	22.7
B-to-C*	7,896	71	7,707	65	2.5	9.2	6.7	6.1
Retail	3,141	34	3,059	28	2.7	22.1	3.2	2.6
Selected Services	4,755	37	4,648	37	2.3	-1.4	3.5	3.5

* We estimate B-to-B and B-to-C e-commerce by making several simplifying assumptions: manufacturing and wholesale e-commerce is entirely B-to-B, and retail and service e-commerce is entirely B-to-C. We also ignore definitional differences among shipments, sales, and revenues. The resulting B-to-B and B-to-C estimates, while not directly measured, show that almost all the dollar volume of e-commerce activity involves transactions between businesses. See the "Note to readers" for cautions relating to the interpretation of the "Total" shown here.

e-commerce represents a much larger share of total economic activity in sectors that sell primarily to other businesses.

Manufacturing

The value of U.S. manufacturing e-commerce shipments (e-shipments) is \$725 billion in 2001, a decrease of 4 percent from revised 2000 e-shipments of \$756 billion. E-shipments, as shown in Table 1, account for 18.3 percent of the value of all shipments from U.S. manufacturing plants in 2001, about the same as in 2000. This information was collected in the 2001 Annual Survey of Manufactures (ASM), a survey of more than 50,000 manufacturing plants.

E-shipments are concentrated. Sixty-eight percent of all e-shipments in 2001 occur in five industry groups, almost identical to 2000. Transportation Equipment is the largest industry group, accounting for 37 percent (\$264 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 all 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 15 of 21 industry groups. The e-shipments share of total shipments is largest in Transportation Equipment (44 percent), followed by Beverage and Tobacco (38 percent) and Electrical Equipment, Appliances, and Components (25 percent).

E-shipments in manufacturing fared somewhat better than total shipments between 2000 and 2001, although both declined. E-shipments declined 4 percent, while total shipments declined 6 percent. The industry group that contributed most to this difference was Computer and Electronic Products. In this industry, e-shipments were \$5 billion less (a decline of 6 percent) compared to an \$81 billion decline for total shipments (a decline of 16 percent).

Merchant Wholesale Trade

U.S. merchant wholesale e-commerce sales (e-sales) reached \$270 billion in 2001, an increase of 12 percent over revised 2000 e-sales of \$241 billion. E-sales, as shown in

Table 2, represent 10.0 percent of total merchant wholesale sales in 2001, up from 8.8 percent in 2000.

This information was collected in the 2001 Annual Trade Survey, a survey of more than 6,900 merchant wholesalers. Merchant wholesalers 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 prior Economic Census, nonmerchant wholesalers accounted for approximately 43 percent of total wholesale trade sales.

E-sales are concentrated, with 64 percent of total e-sales by merchant wholesalers occurring in three industry groups. Drugs and Druggists' Sundries wholesalers account for 36 percent (\$97 billion); Motor Vehicles, Parts and Supplies wholesalers, 16 percent (\$44 billion); and Professional and Commercial Equipment and Supplies wholesalers, 11 percent (\$31 billion). These same industry groups accounted for about 62 percent of e-sales by merchant wholesalers in 2000.

While all merchant wholesale industry groups have some e-sales, opportunities for expanded e-sales remain. Only six industries or industry groups sell 10 percent or more of their merchandise over online networks. Drugs and Druggists' Sundries wholesalers' e-sales are

48 percent of their total sales, Motor Vehicles, Parts and

Supplies wholesalers' e-sales represent 22 percent of their total sales, Apparel Piece Goods and Notions wholesalers' e-sales are 14 percent of total sales, Computer Equipment and Supplies wholesalers' e-sales account for 13 percent of total sales, and Hardware, Plumbing and Heating Equipment wholesalers' e-sales are 10 percent of their total sales.

E-sales by Merchant Wholesalers grew strongly from 2000 to 2001 while total sales

declined. E-sales were up by 12 percent, compared to a 1 percent decline in total sales. E-sales increased while total sales declined in most merchant wholesale industry groups. More than half of the growth in e-sales came from Drugs and Druggists' Sundries, where e-sales grew \$19 billion and sales grew \$33 billion.

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. In 2001, EDI sales for merchant wholesalers total \$233 billion and account for 86 percent of their e-commerce sales.

Selected Service Industries

U.S. e-commerce revenues (e-revenues) for selected service industries are \$37 billion in 2001, virtually the same level as 2000 e-revenues. As shown in Table 4, e-revenues account for 0.8 percent of total revenues in these sectors in both years.

Four groups account for 49 percent of total Selected Service e-revenues. Travel Arrangement and Reservation Services account for 17 percent of total Selected Service e-revenues, and Publishing, including newspaper, periodical, book, and software publishers, accounts for an additional 13 percent. Securities and Commodity Contracts Intermediation and Brokerage and Computer Systems Design and Related Services are each 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 4 percent of total revenues.

Total revenues grew between 2000 and 2001 in the Selected Services Industries but e-revenues were virtually unchanged. Total revenues increased by 2 percent. Within Selected Services Industries, declines in



e-revenues were partially offset by strong growth in the Information industry. Information industry e-revenues grew 12 percent (\$1 billion), and its revenues grew 3 percent (\$25 billion).

The Selected Services 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 prior Economic Census and 55 percent of their total revenues. This information was collected in the 2001 Services Annual Survey, a survey of more than 51,000 firms.

Retail Trade

U.S. retail e-commerce sales (e-sales) reached \$34 billion in 2001, an increase of 22 percent over revised 2000 e-sales of \$28 billion. Retail e-sales, as shown in Table 5, account for 1.1 percent of total retail sales in 2001, up from 0.9 percent in 2000. This information is collected in the 2001 Annual Retail Trade Survey, a survey of more than 19,000 retailers.

E-sales are concentrated in two groups that account for over 90 percent of retail e-sales: Nonstore Retailers, and Motor Vehicle and Parts Dealers. Nonstore Retailers account for 75 percent (\$26 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 result 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.

Retail e-sales growth of 22 percent between 2000 and 2001 strongly outpaced total retail sales growth of 3 percent. Within Retail, e-sales of Nonstore Retailers grew 21 percent between 2000 and 2001, in contrast to the 2 percent decline in this group's total sales. Both total sales and e-sales grew for Motor Vehicle and Parts Dealers. While total sales for this group grew 3 percent, its e-sales rose at a robust 25 percent.

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 Clothing and Clothing Accessories (including footwear) with \$3 billion in e-sales.

For the Electronic Shopping and Mail-Order Houses industry, e-sales accounted for 24 percent of all sales in 2001, compared to 19 percent in 2000. Merchandise categories with the highest percent of online sales include Books and Magazines with 45 percent of total sales online, and Electronics and Appliances with 39 percent of sales online. In fact online sales are significant in almost all merchandise lines.

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 2002 and the preliminary estimate

for the year 2002 were released on February 24, 2003.

U.S. retail e-sales were \$14 billion in the fourth quarter of 2002 and accounted for 1.6 percent of total retail sales (\$870 billion) in that quarter. The preliminary estimate of total e-sales for 2002 is \$46 billion, accounting for 1.4 percent of total retail sales for 2002. The most recent data are available at <http://www.census.gov/estats>.

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 2001 Annual Survey of Manufactures (ASM), the 2001 Annual Trade Survey (ATS), the 2001 Service Annual Survey (SAS), and the 2001 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 value 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.

Importance of EDI Networks. The dominant position of B-to-B e-commerce 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 were separately identified for the first time in the 2000 Annual Trade Survey.

Survey Methods

Annual Survey of Manufactures

The ASM is designed to produce estimates for the manufacturing sector of the economy. The manufacturing universe is comprised of approximately 355,000 plants. Data are collected annually from a probability sample of more than 50,000 manufacturing plants with five or more employees. Data for plants with less than five employees are estimated using information obtained from administrative sources.

The ASM is a survey of manufacturing plants and represents activities at individual plants rather than the entire company. For the 2001 survey year, questions about e-commerce were included on the ASM questionnaire along with questions about such things as employment, payroll, value of

shipments, cost of materials consumed, and capital expenditures. For years prior to 2001 (2000 and 1999) the e-commerce data while collected from the same panel, were collected on a separate questionnaire. In all years, information for nonresponding plants was 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 were weighted by the reciprocal of the probability of the plant's inclusion in the ASM sample. These estimates were then linked to the prior Economic Census results to reduce sampling and non-sampling errors. The estimates for 2000 included in this report are revised from those originally published in the March 2002 edition of E-Stats. These revisions were small.



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 and Insurance; Real Estate and Rental and Leasing; Professional, Scientific, and Technical Services; Administrative 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 approximately 3 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 prior 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 2001.

All wholesale, service, and retail firms mailed in the surveys were asked to report total and e-sales/e-revenue for 2001. 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 2001 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 prior Economic Census to reduce sampling error and to allow comparability with the census results.

The data for 2000 included in this report are revised from those originally published in the March 2002 edition of E-Stats. For retail, the revisions were modest and were primarily the result of respondents correcting data for 2000.

For merchant wholesalers, the original 2000 e-sales estimate was revised up by \$28 billion. During our review of the 2001 EDI

sales, we found a number of respondents reporting large amounts of EDI in 2001 but no EDI in 2000. We contacted these respondents to determine if there should have been EDI sales in 2000. In most cases, there should have been EDI sales, and we were able to obtain new data. We made these corrections to 2000 EDI sales, which also resulted in an upward revision in the 2000 e-commerce sales 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 collection 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 total dollar value. 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, suppose the estimated total value of shipments 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 E-commerce Sales
Estimated from Reported Data**

Survey	Total Sales	E-commerce Sales
ASM	90	78
ATS	90	94
ARTS	92	87
SAS	88	81

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 2003.
- *E-Stats* 2002 will be released in Spring 2004.

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.

