New Digital Economy Estimates

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Abstract

This report introduces new and revised estimates for the digital economy as calculated by the Bureau of Economic Analysis (BEA) for the period 2005–2018. BEA first published digital economy estimates in March 2018 and published an updated set of estimates in April 2019. The March 2018 estimates represent BEA's initial efforts to lay the foundation for a digital economy satellite account and were the first set of estimates available within the framework of the national accounts.[1] Conceptually, a digital economy satellite account should include all goods and services related to the digital economy. However, BEA's measures published to date are based on goods and services that are primarily digital. Some goods and services categories include a mix of both digital and nondigital goods and services. BEA has been exploring data and methods to overcome the challenges of measuring "partially digital" goods and services to expand the coverage of the digital economy measures.

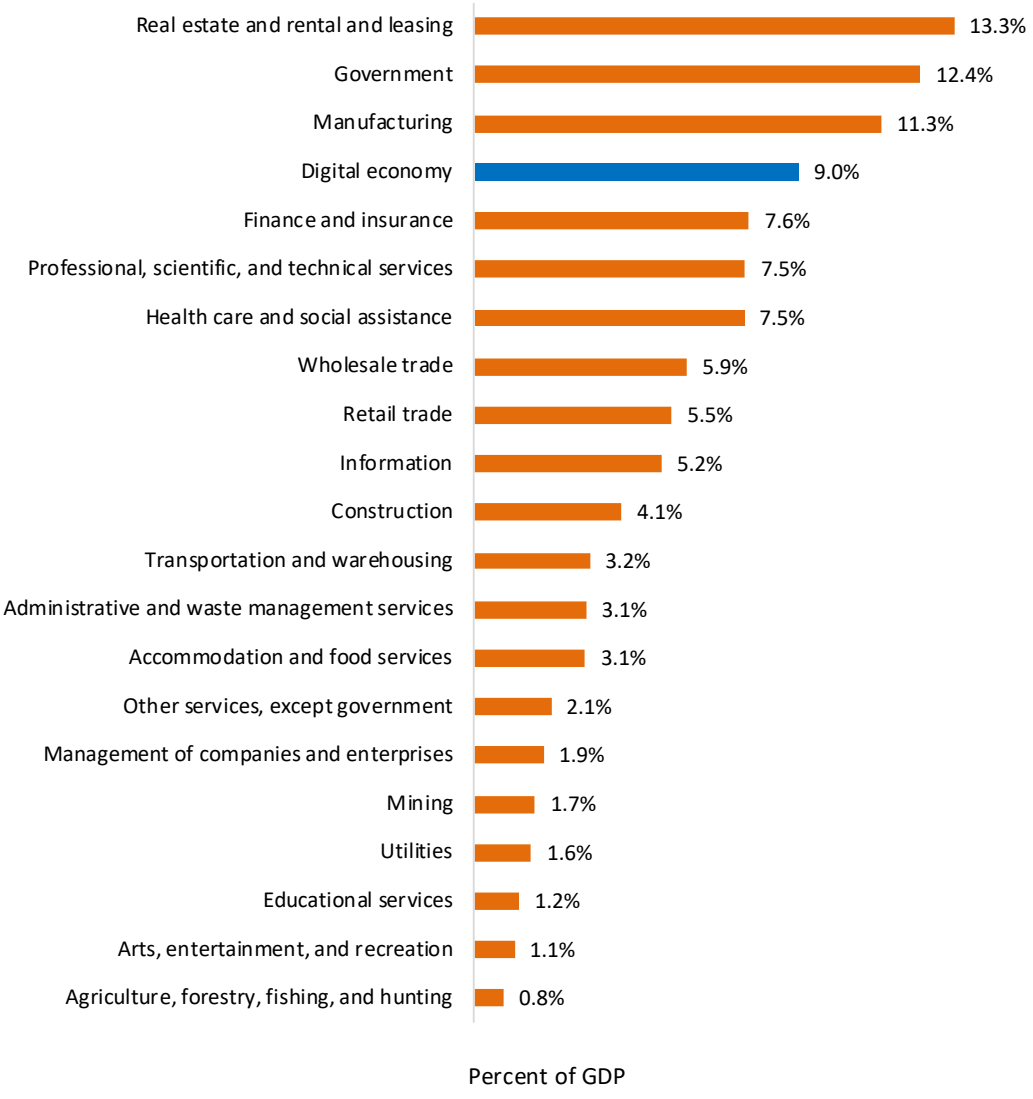
The estimates published in this report expand the coverage of the digital economy estimates by partially including additional items for retail and wholesale e-commerce. This report also introduces new estimates for cloud services. The progress in developing BEA's digital economy estimates is a result of its collaboration with other organizations to improve the accuracy and comparability of the digital economy estimates and BEA's own internal research.

[1] Satellite accounts are supplementary statistics that allow analysis of a particular aspect of the economy, such as spending on travel and tourism or on arts and culture. The methods used to produce satellite accounts are consistent with those used for "core" economic accounts.

Introduction

This report introduces new and revised estimates of the value of gross output, value added, employment, and compensation for the digital economy, as calculated by BEA for the period 2005–2018. According to the new estimates, the digital economy accounted for 9.0 percent ($1,849.3 billion) of current-dollar gross domestic product (GDP) ($20,580.2 billion) in 2018. When compared with traditional U.S. industries or sectors, the digital economy ranked just below the manufacturing sector, which accounted for 11.3 percent ($2,321.2 billion) of current-dollar GDP, and just above finance and insurance, which accounted for 7.6 percent ($1,567.3 billion) of current-dollar GDP (chart 1).

Chart 1. Digital Economy and Industry Share of Total Gross Domestic Product, 2018



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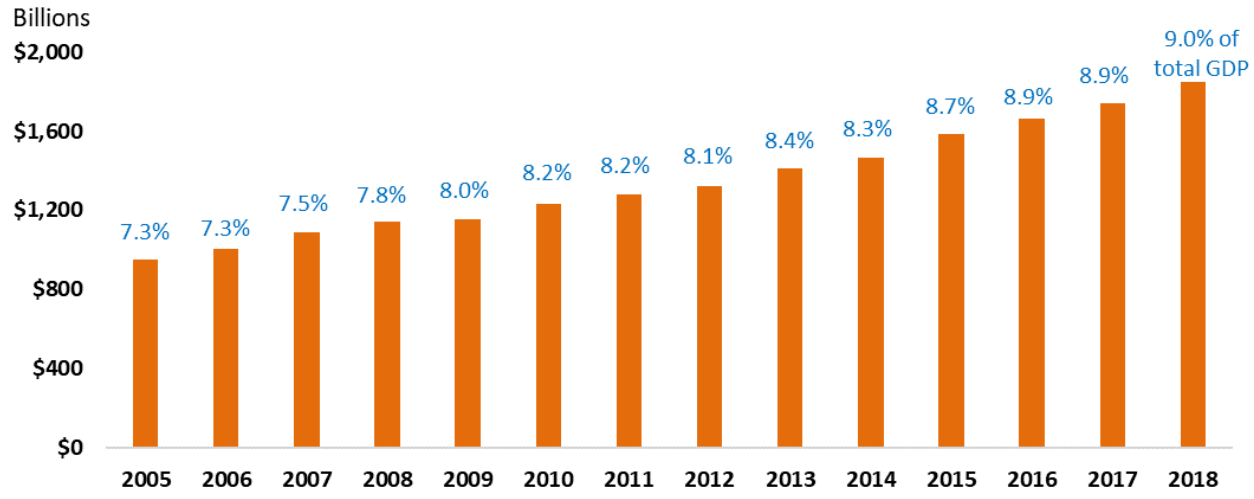
The updated estimates continue to show the relatively strong growth of the digital economy. Digital economy real value added grew at an average annual rate of 6.8 percent per year from 2006 to 2018, compared to 1.7 percent growth in the overall economy. The faster growth rate of the digital economy helped the digital economy share of the total economy grow from 7.3 percent ($948.4 billion) in 2005 to 9.0 percent ($1,849.3 billion) in 2018 (chart 2).

Chart 2. Digital Economy Current-Dollar Value Added and Share of Total Gross Domestic Product



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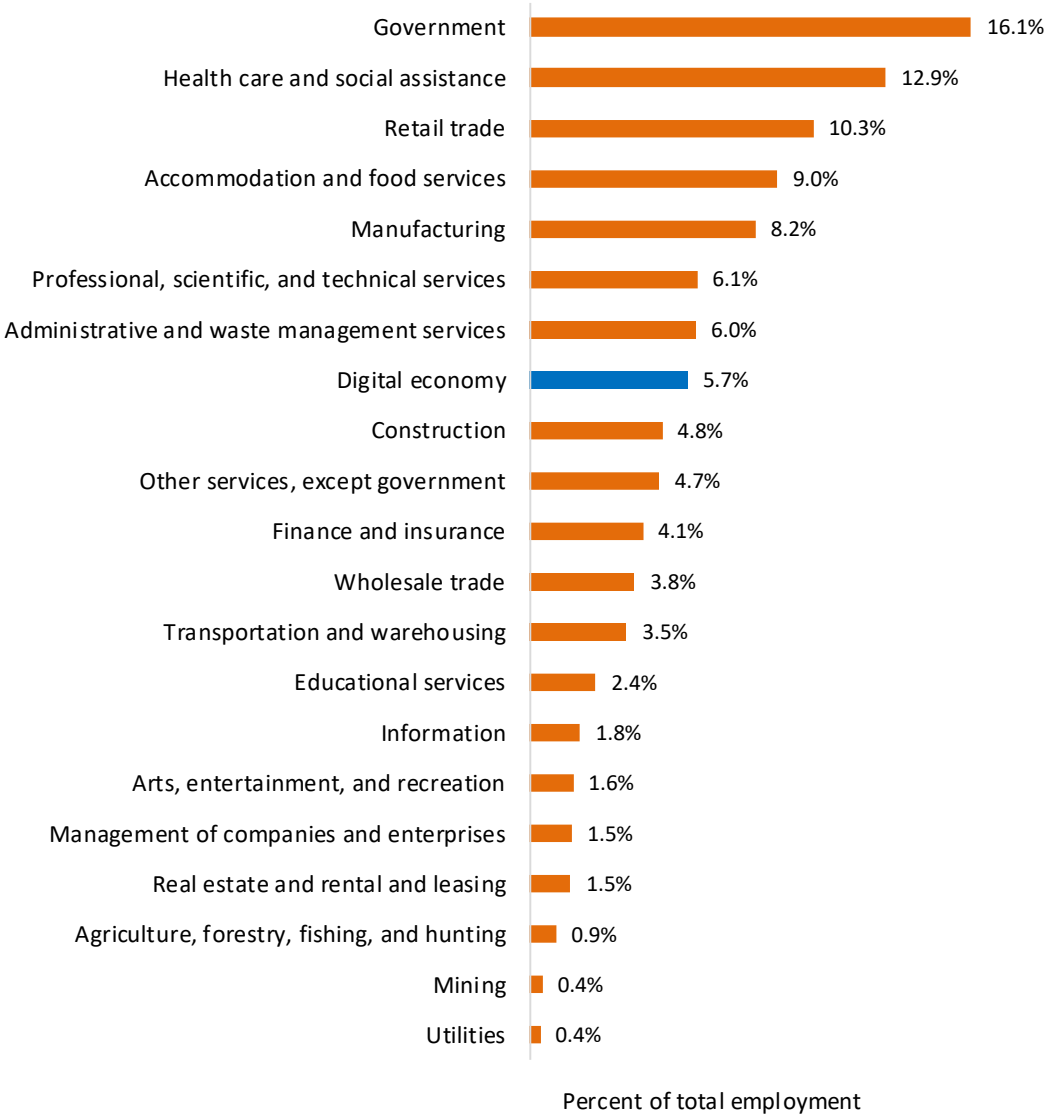
In 2018, the digital economy supported 8.8 million jobs, which accounted for 5.7 percent of total U.S. employment (154.7 million jobs) (chart 3). The digital economy supported more jobs than the construction industry and the industry made up of "other" services, except government. Employees working in the digital economy earned $105,473 in average annual compensation compared to $70,858 average annual compensation per worker for the total U.S. economy.

This report first provides a brief overview of the methodology used to develop these estimates. It then discusses the new presentation of the digital economy estimates. Results are presented to highlight the impact of the digital economy. Lastly, the report explains how BEA expanded the coverage of retail and wholesale e-commerce and estimated values for cloud services.

Chart 3. Digital Economy and Industry Share of Total Employment, 2018



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Methodology

BEA constructed the estimates presented in this paper within a supply-use framework following the same methodology developed for the initial estimates published in the March 2018 report. For that report, BEA first developed a conceptual definition of the digital economy. BEA's information and communications technology (ICT) sector served as a starting point for the definition of the digital

economy.[2] While not all ICT goods and services are fully in scope, the ICT sector and the digital economy largely overlap. The estimates presented in this report include BEA's ICT sector as well as additional goods and services determined to be in scope for the digital economy.

The definition of the digital economy used for this report has not changed. However, as BEA and other organizations move forward with developing methodologies for measuring the digital economy, it is necessary to adjust how the definition is applied so that the results are accurate and internationally comparable. This report introduces presentational changes to BEA's digital economy estimates that aim to make the estimates more comparable with estimates and guidance available from other organizations.

To create digital economy estimates, BEA identified specific goods and services categories within BEA's supply-use framework relevant to measuring the digital economy. In previous estimates, only items considered to be primarily digital were included. The estimates presented in this report include items on a partial basis for the first time, meaning that only the in-scope portion of an item's value is included in the estimates. The partial inclusion of additional retail and wholesale e-commerce items expands the coverage of the BEA digital economy estimates.

BEA used the supply-use framework to identify the industries responsible for producing the identified digital economy goods and services and estimated output, value added, employment, compensation, and other variables for these industries. More information is available in the box "BEA Methodology for Estimating Supply-Use Tables" within this document.

Components of the Digital Economy

Since the initial publication of BEA's digital economy statistics in March 2018, other organizations have published their own estimates of the digital economy's economic impact as well as guidance on how to consistently and accurately develop these measures. Statistics Canada released their first set of digital economy estimates on May 3, 2019.[3] The digital economy estimates for Canada align closely with BEA's initial estimates. BEA and Statistics Canada continue to collaborate and consult with each other throughout the process of creating these measures. Both BEA and Statistics Canada also continue to work to employ the latest guidance from the Organisation for Economic Co-operation and Development (OECD) on measuring GDP in a digitalized economy, which both the United States and Canada are actively involved in developing.[4]

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[2] The BEA ICT sector consists of computer and electronic product manufacturing (excluding navigational, measuring, electromedical, and control instruments manufacturing); software publishers; broadcasting and telecommunications; data processing, hosting, and related services; internet publishing and broadcasting and web search portals; and computer systems design and related services. BEA's definition is generally consistent with the internationally accepted definition of the ICT sector used and developed by the statistical offices of the OECD and the United Nations.

[3] The Statistics Canada release is available on their website.

[4] OECD Working Party on National Accounts, "A Proposed framework for Digital Supply-Use Tables," SDD/CSSP/WPNA(2018)3, November 2018, and "Guidelines for Supply-Use Tables for the Digital Economy."

To further promote comparability across estimates, BEA revised the publication structure for the digital economy estimates. The overall scope, or definition, of the digital economy has not changed from the March 2018 report. However, BEA is continuing to expand the coverage of the digital economy estimates to include additional components or to more comprehensively cover components previously estimated. Each of the major components and the status of their inclusion in the BEA estimates is described below.

Infrastructure

Infrastructure is comprised of the basic physical materials and organizational arrangements that support the existence and use of computer networks and the digital economy; primarily ICT goods and services. Table 1 describes the subcomponents included in infrastructure and indicates BEA's coverage of the subcomponent in the current digital economy estimates. For structures, BEA does not currently have data available to separate digital economy-related construction activity from all other construction.

Table 1. Description of the infrastructure component of the BEA digital economy measures

Infrastructure subcomponent	Subcomponent description	Status of inclusion
Hardware	The manufactured physical elements that constitute a computer system including, but not limited to, monitors, hard drives, and semiconductors. Also includes communications products and audio and visual equipment products.	Included almost comprehensively
Software	The programs and other operating information used by devices such as personal computers and commercial servers, including both commercial software and software developed in-house by firms for their own use.	Included almost comprehensively
Structures	The construction of buildings intended for the creation of digital economy goods or the provision of digital economy services. The structures category also includes buildings that provide support services to digital products. This includes the construction of data centers, semiconductor fabrication plants, the installations of fiber optic cables, switches, repeaters, and so forth.	Not yet included; part of ongoing work

SDD/CSSP/WPNA(2019)3.

BEA Methodology for Estimating Supply-Use Tables

The supply-use tables are an integral and essential element of the U.S. economic accounts. First, they are the building blocks for other economic accounts. Prominent among these are the BEA's national income and product accounts (NIPAs), which feature the estimates of expenditure-based GDP. Second, the supply-use tables show how industries interact; specifically, they show how industries provide input to, and use output from, each other to produce GDP. They are a complete, balanced set of economic statistics, and they present a full accounting of industry and final-use transactions.

The core of the supply-use tables consists of two basic national-accounting tables—a "supply" table and a "use" table. The supply table shows the commodities that are available for domestic consumption. The use table shows the inputs to industry production (intermediate inputs) and the commodities that final users consume. The use table is the most frequently requested table because of its applications to the estimates of GDP.

The BEA uses the North American Industry Classification System (NAICS) to classify industries. The United States, Canada, and Mexico jointly developed this classification system with the aim of improving the comparability of their economic statistics. NAICS classifies industries based on their production processes. The NAICS codes comprise six digits, which reading from left to right, indicate the general sector down to a detailed industry.

The U.S. statistical system does not currently have a separate classification system for commodities, which are groups of similar products defined by the characteristics of the product (commodity) itself rather than by the production process. At present, BEA uses a commodity classification system to assign each commodity the code of the industry in which the commodity is the primary product. The foundation for this commodity classification system is the six-digit NAICS code.

BEA prepares benchmark supply-use tables roughly every five years based on the highest quality source data, notably the U.S. Census Bureau's Economic Censuses. Largely because of their rich source data, the benchmark supply-use tables are the most important statistical source of information for comprehensive updates of the NIPAs and are widely used by other statistical agencies. BEA released the most recent benchmark supply-use tables in 2018. These accounts cover 2012 and use the 2012 NAICS for classification.

E-commerce

E-commerce is the remote sale of products, or goods and services, over computer networks by methods specifically designed for the purpose of receiving or placing orders. Products purchased through e-commerce are also referred to as "digitally ordered." This paper will discuss how BEA has recently expanded e-commerce coverage in the estimates. Table 2 defines the e-commerce subcomponents.

Table 2. Description of the e-commerce component of the BEA digital economy measures

E-commerce subcomponent	Subcomponent description	Status of inclusion
Business-to-business (B2B) e-commerce	Purchasing of goods and services between businesses using the internet or other electronic means. Manufacturers, wholesalers, and other industries engage in both interfirm and intrafirm e-commerce to produce goods and services for final consumption.	Included almost comprehensively
Business-to-consumer (B2C) e-commerce	The sale of goods and services by businesses to consumers, or retail e-commerce, using the internet or other electronic means.	Included almost comprehensively

Expanded E-Commerce Coverage

In previous BEA estimates of the digital economy, there was limited coverage of e-commerce. E-commerce output is generally measured as the wholesale or retail trade margin on digitally ordered goods and services sold over the internet or through some other electronic market. The margin is equal to total revenue earned from online sales less the producer cost of the goods and services. In previous estimates, BEA included the margins for both B2B wholesale and B2C retail transactions from electronic market establishments. BEA also included some nonmargin output in the form of fees for brokers that connect buyers and sellers. BEA used survey data from the U.S. Census Bureau to expand e-commerce coverage in the latest set of estimates by including values of both B2C and B2B e-commerce across the entire U.S. economy.

BEA used data from the Annual Retail Trade Survey (ARTS) to expand the coverage of B2C e-commerce in the digital economy estimates to include retail e-commerce across all types of outlets, or stores, in the economy.[5] BEA used ARTS data on retail e-commerce sales and total retail sales at the three-digit NAICS level to calculate the e-commerce share of sales. These ratios are applied to the values of retail trade margin items from all outlet types from the BEA industry accounts.[6]

[5] See the Annual Retail Trade Survey.

[6] This assumes that the retail trade margins for e-commerce sales are the same as those for brick-and-mortar, or in-store, retail sales. For some outlet types for some years, data are missing, denoted by "D" (estimate withheld to avoid disclosing data of individual companies) or "S" (estimate does not meet publication standards, because of high sampling variability, or coefficient of variation is greater than 30 percent), because of poor response quality (total quantity response rate is less than 50 percent) or other concerns about the estimate's quality; data are

For B2B e-commerce, BEA used data from the Annual Wholesale Trade Survey (AWTS).[7] The AWTS estimates merchant wholesale trade e-commerce sales and total merchant wholesale trade sales. Using the same method described to calculate B2C e-commerce, BEA calculated the share of wholesale trade e-commerce sales at the three-digit NAICS level for all years for which data are available. These ratios are applied to wholesale trade margin output from the BEA industry accounts for all wholesale activity.[8]

Previously, BEA published estimates for e-commerce and digital media together as one digital economy component. In the previous results published in April 2019, BEA estimated current-dollar gross output for e-commerce and digital media to be $315.6 billion in 2017. Recall that coverage of both these categories was limited. With expanded coverage using ARTS and AWTS data, BEA now estimates 2017 current-dollar gross output of B2C e-commerce to be $231.5 billion and current-dollar gross output of B2B e-commerce to be $552.3 billion; together these more than double the previous estimate for e-commerce and digital media.

included in higher level totals. However, the aggregate annual value of wholesale e-commerce is available for all years. In some cases, the partial value is estimated using interpolation or scaling. There was no attempt to estimate ratios for outlet types when there is no data available throughout the series (for example, gasoline stations) or when the reason for a missing value is denoted as "NA," not available.

[7] See the Annual Wholesale Trade Survey.

[8] This assumes that the wholesale trade margins for e-commerce sales are the same as those for traditional sales. For some business types for some years, data are missing, denoted by "D" (estimate withheld to avoid disclosing data of individual companies) or "S" (estimate does not meet publication standards, because of high sampling variability, or coefficient of variation is greater than 30 percent), poor response quality (total quantity response rate is less than 50 percent), or other concerns about the estimate's quality; data are included in higher-level totals. However, the aggregate annual value of wholesale e-commerce is available is available for all years. In some cases, the partial value is estimated using interpolation or scaling. There was no attempt to estimate ratios for business types in data when the reason for a missing value is denoted as "NA," not available.

Priced Digital Services

Priced digital services relate to computing and communication and are performed for a fee charged to the consumer. Additionally, this category includes services that support the digital economy, such as computer repair services and digital consulting services. Table 3 describes how priced digital services are captured in the BEA digital economy estimates.

Table 3. Description of the priced digital services component of the BEA digital economy measures

Priced digital services subcomponent	Subcomponent description	Status of inclusion
Cloud services, priced	Computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort. Remote and distributed hosting, storage, computing, and security services.	Included almost comprehensively; estimate is derived using additional source data including the Economic Census and Statista's Technology Market Outlook
Digital intermediary services, priced	The service of providing information on, and successfully matching, two independent parties to a transaction via a digital platform in return for an explicit fee. The output of these platforms typically consists of the fees paid by the producer and/or the consumer of the product being intermediated.	Not separately identified; part of ongoing work
All other priced digital services	All other purchased digital services (excluding cloud computing and digital intermediation services).	Included almost comprehensively

Cloud Services

To estimate the value of cloud services, BEA used Economic Census product line data, Statista's estimates of cloud services revenue, and BEA data. Cloud services are spread across several BEA item codes that also include noncloud services. To estimate the value of cloud service, BEA needed to determine the portion of each relevant item code to include. The Economic Census publishes total receipts for various product lines by industry. BEA identified Economic Census product lines associated with cloud computing services. These product lines are shown in table 4.

Table 4. Economic Census Product Lines for Paid Cloud Services

Product line	Description
34930	Application service provisioning, with or without integration of related services
36120	Website hosting service, with or without integration of related services
36130	Collocation services
36140	Data storage services
36150	Data management services
36160	Video and audio streaming services
36170	Other data processing or IT infrastructure provisioning services
36220	Information and document transformation services

The Economic Census is conducted every 5 years, with 2012 data the most recent data available at this time.[9] BEA identified industries with receipts for the selected product lines in the 2002, 2007, and 2012 Economic Census data. Receipts for cloud services product lines were totaled for each industry at the finest level of detail that corresponds to the BEA commodity item list. Table 5 displays the industries with cloud services receipts.[10]

Table 5. Industries with Cloud Services Receipts in the Economic Census

NAICS code	Industry name
511210	Software publishers
518210	Data processing, hosting, and related services
5191301	Internet publishing and broadcasting
5191302	Web search portals
5414	Specialized design services
541511	Custom computer programming services
541512	Computer systems design services
541513	Computer facilities management services
541519	Other computer related services

For periods between Economic Census years 2002 and 2007 and Census years 2007 and 2012, BEA interpolated to fill in values for both cloud services receipts by industry and total receipts by industry. For 2013 through 2019, BEA used data from Statista's Technology Market Outlook on U.S. cloud services market revenue to extrapolate the cloud services receipts estimated from the 2012 Economic Census

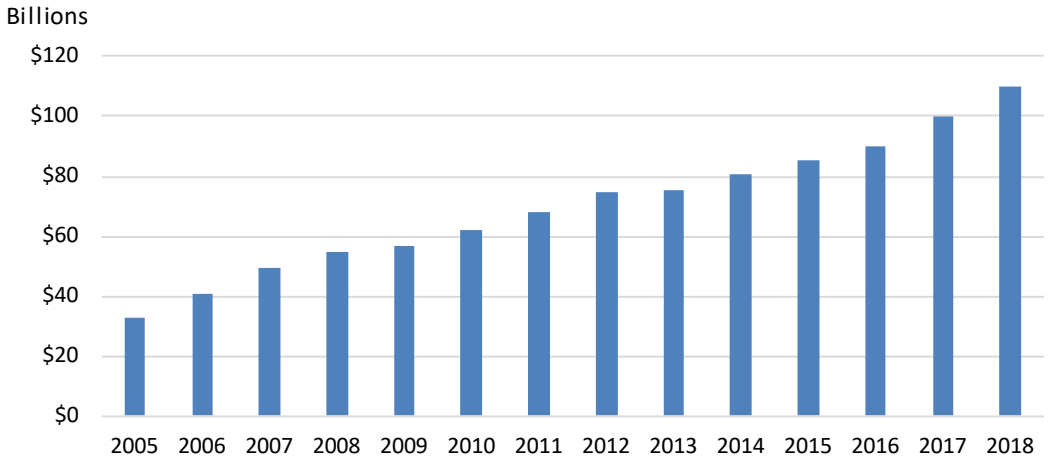
[9] The Census Bureau releases Economic Census data on a flow basis. Some 2017 Economic Census data is now available on the Census website. Product line data from the 2017 Economic Census will be released in November 2020.

[10] For some years, data are only available at a more aggregated industry level. For example, only NAICS 51913 is available, so 5191301 and 5191302 were estimated by BEA proportional to the latest year that data are available.

data.[11] BEA then calculated ratios of cloud services receipts to total receipts for all industries with cloud services receipts and scaled the values to BEA gross output.

BEA estimated current-dollar gross output for cloud service, paid at $110.0 billion in 2018, with 9.8 percent average annual growth over the 2005–2018 period (chart 4).

Chart 4. Cloud Services, Paid, Current-Dollar Gross Output



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BEA is continuing research aimed at estimating the value of digital intermediary services. Information on BEA research related to these subcomponents is available on the BEA website.[12]

Results

The estimates in this report cover the 2005–2018 period to avoid overstating the value of the digital economy in earlier years. BEA currently fully includes many good and services in the digital economy estimates. Accurately estimating the emergence of the digital economy in earlier years would require data to split these products into a digital and nondigital portion. Additional research may allow for more precise historical estimates. Additionally, as noted above, some components of the digital economy are not covered at all in the current estimates—these components are structures; digital intermediary services, priced; free digital service; and data.

Gross Domestic Product or Value Added

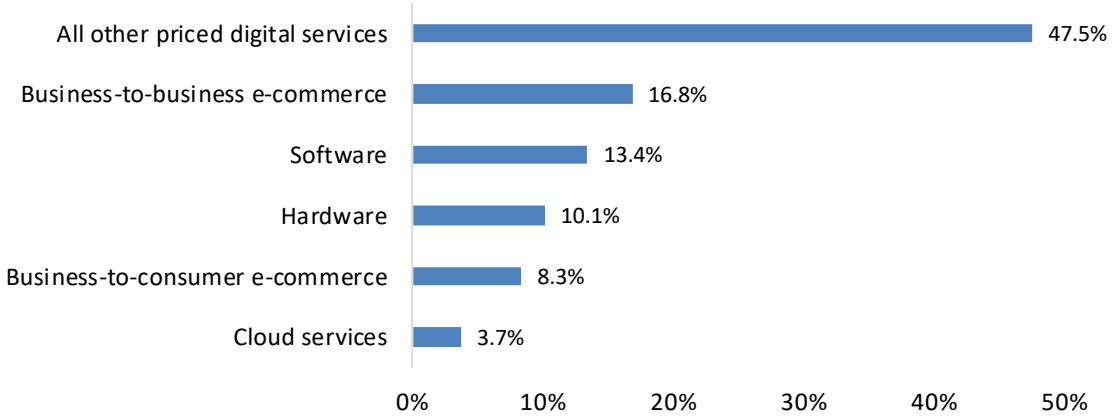
GDP is the value of the goods and services produced by the nation's economy less the value of the goods and services used up in production. GDP by industry, or value added, is a measure of an industry's

[11] Statista's cloud services market revenues include the subsegments cloud-security**is hyphen needed?, hosting, storage, and computing services. The values for 2017 are predominantly estimates based on up-to-date data points. Values for 2018 are mostly forecasts with some estimates.
[12] See "Other Research and Information" on BEA's digital economy webpage.

contribution to overall GDP. In 2018, priced digital services, which includes cloud services (3.7 percent) and all other priced digital services (47.5 percent) composed more than half of the digital economy's value added, as shown in chart 5. The full list of services included in this component is available in the Appendix of this report.

E-commerce, split between B2B e-commerce (16.8 percent) and B2C e-commerce (8.3 percent), comprised just over a quarter of the digital economy, while infrastructure, composed of software (13.4 percent) and hardware (10.1 percent), made up the rest.

Chart 5. Component Share of the Digital Economy, Current-Dollar Value Added, 2018



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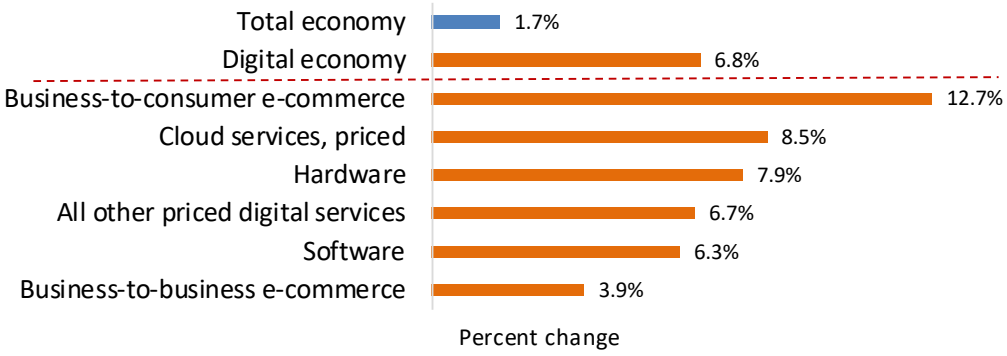
From 2006 to 2018, B2C e-commerce experienced the fastest average growth of all the components, with real value added growing at 12.7 percent on average per year (chart 6). B2B e-commerce grew the slowest at 3.9 percent. All components of the digital economy grew faster than the overall economy over this period.

Chart 6. Components of the Digital Economy: Real Value-Added Average Annual Growth, 2006–2018



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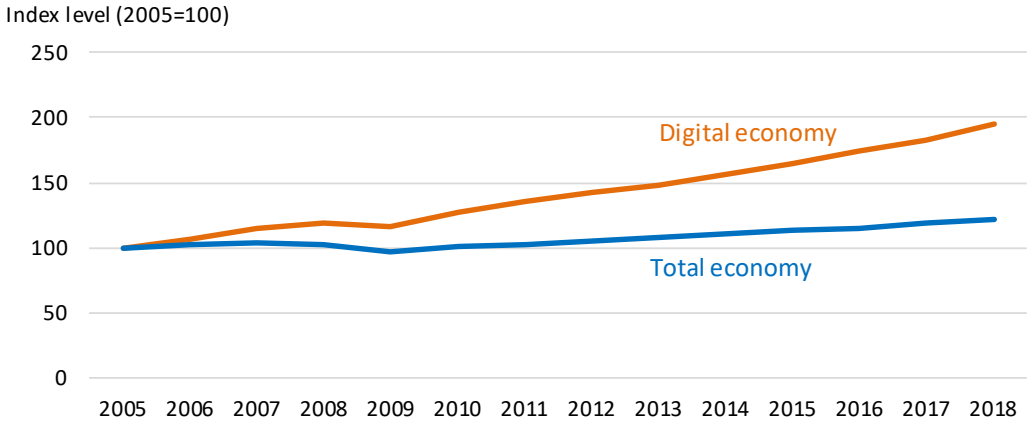
Gross Output

Gross output is a measure of sales or revenue from production for most industries. Real gross output for the digital economy grew at an annual rate of 5.2 percent from 2005 to 2018, faster than the total economy, which grew at an average annual rate of 1.5 percent. When output is indexed to a base year, the compound effect of the faster output growth in the digital economy relative to the overall economy is clearly seen by the divergence of the two lines in chart 7.

Chart 7. Real Gross Output Index



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During this period, prices for digital economy goods and services decreased at an average annual rate of 0.5 percent (chart 8). Prices for all goods and services in the economy increased at an average annual rate of 1.9 percent. As the digital economy matures and technology improves, prices for hardware, software, and some services have declined (chart 9).

Chart 8. Gross Output Price Index

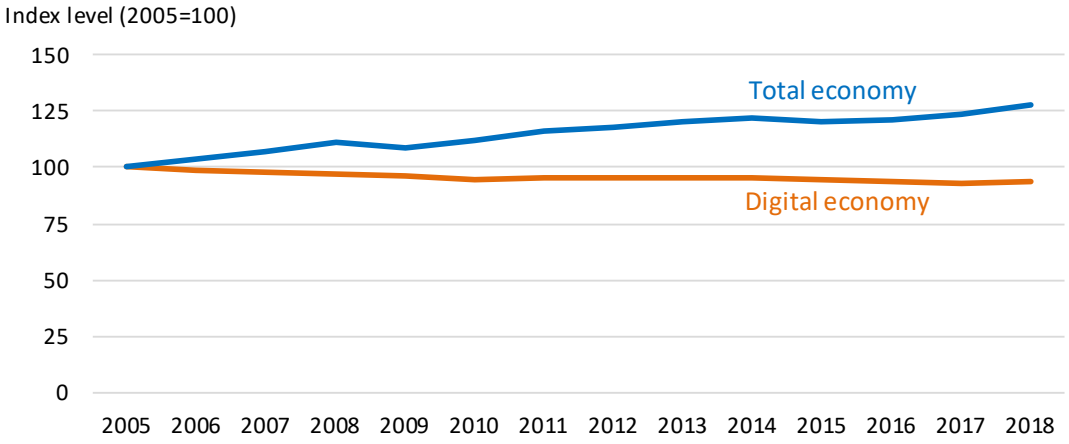

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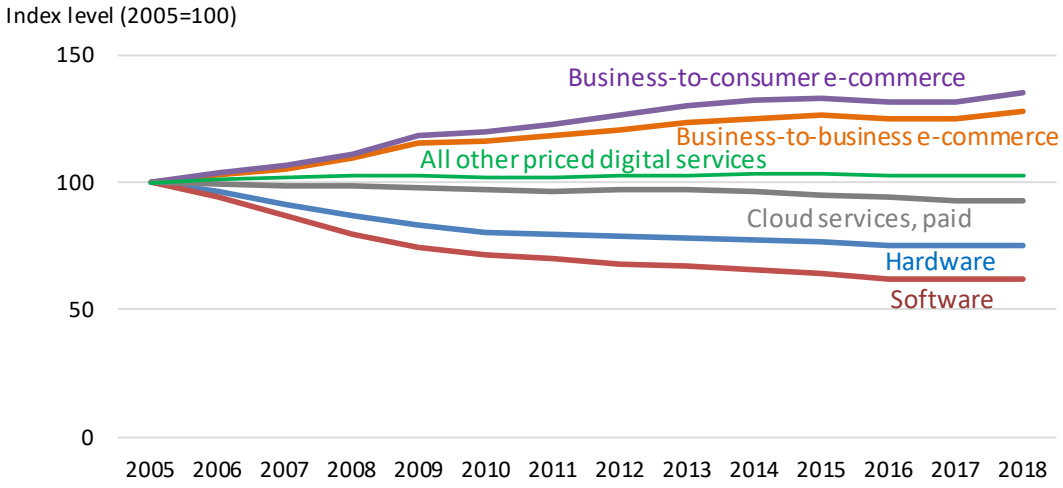
Chart 9. Gross Output Price Indexes for Digital Economy Components



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Conclusion

The updates described in this report expand the coverage of BEA's digital economy estimates. This latest set of estimates incorporate guidance on terminology and digital economy structure from the OECD. BEA will continue to participate in shaping the international guidance around how to measure the digital economy and will revise these estimates accordingly as new guidance is finalized. BEA is currently working to determine the feasibility of populating digital supply-use tables using OECD guidance.[13] BEA is also actively working to develop methodology for estimating the components of the digital economy for which estimates are missing. New data sources and continued research will help BEA continue to advance the accuracy of the estimates and expand coverage to a wider portion of the total digital economy.

Acknowledgments

The author would like to thank William Jolliff for processing the digital economy estimates and for technical guidance throughout the development of the new estimates. Additional thanks to BEA's Erich H. Strassner, Associate Director for National Economic Accounts; Thomas F. Howells III, Chief of the Industry Economics Division; and Dylan Rassier, Chief of the National Accounts Research Group, for their guidance and review and to Shaun Carter and David Curtis of the National Economic Accounts Directorate for their review of the report, charts, and tables.

This report is based on the original digital economy methodology used to publish the March 2018 working paper by Kevin Barefoot, David Curtis, William A. Jolliff, Jessica R. Nicholson, and Robert Omohundro.

[13] OECD guidance for developing digital supply-use tables is available on the OECD website.

Appendix. BEA Items Included in the Digital Economy Estimates

These items are fully included in the BEA digital economy estimates.

Hardware	
NAICS	**Item Description**
333242	Semiconductor manufacturing equipment
333242	Semiconductor manufacturing equipment parts
333242	Semiconductor machinery manufacturing other miscellaneous receipts
333242	Semiconductor machinery manufacturing inventory change
333242	Semiconductor machinery manufacturing repair work
33329N	Digital electronic prepress systems, components, and elements, including color and black and white scanners, digitizers, and recorders
33399P	Other general-purpose machinery manufacturing, not elsewhere classified repair work
334111	Host computers, multiusers (mainframes, super computers, medium scale systems, UNIX servers, PC servers)
334111	Single user computers, microprocessor-based, capable of supporting attached peripherals (personal computers, workstations, portable computers)
334111	Other Computers, including Array and Other Analog, Hybrid, and Special Purpose
334111	Electronic computers, not specified by kind, total
334111	Electronic computer manufacturing other miscellaneous receipts
334111	Electronic computer manufacturing inventory change
334112	Computer storage devices (except parts, attachments,
334112	Parts, attachments, and accessories for computer storage devices
334112	Computer storage device, not specified by kind, total
334112	Computer storage device manufacturing other miscellaneous receipts
334112	Computer storage device manufacturing inventory change
334113	Input devices, all types
334113	Impact printers
334113	Nonimpact printers
334113	Digital cameras
334113	Optical scanning devices
334113	Monitors, accessories, and other peripheral equipment.
334113	Parts, attachments, and accessories for computer peripheral (input-output) equipment
334113	Point-of-sale terminals and funds-transfer devices

Hardware (continued)	
NAICS	**Item Description**
334113	Other computer peripheral equipment manufacturing other miscellaneous receipts
334113	Parts and attachments for point of sale terminals and fund-transfer devices
334113	Other computer peripheral equipment manufacturing inventory change
334113	Other computer peripheral equipment, not specified by kind, total
334118	Computer terminals (excl. parts/attachments/accessories/etc.)
334118	Parts, attachments, and accessories for computer terminals (except point-of-sale and funds-transfer devices)
334118	Computer terminal manufacturing other miscellaneous receipts
334118	Computer terminal manufacturing inventory change
334118	Computer terminals, not specified by kind, total
334210	Parts, components, and subassemblies for telephone switching equipment
334210	Telephone switching equipment
334210	Carrier line equipment and nonconsumer modems
334210	Parts, components, and subassemblies for other telephone and telegraph equipment
334210	Telephone sets, including wireless phone sets, exclude cell phones
334210	Wireline voice equipment
334210	Data communications equipment (including routers, gateways, bridges, terminal servers, and concentrators)
334210	Telephone Apparatus, not specified by kind
334210	Telephone apparatus manufacturing other miscellaneous receipts
334210	Telephone apparatus manufacturing inventory change
334220	Other communication systems and equipment
334220	Broadcast, studio parts and accessories
334220	Broadcast, studio, and related electronic equipment
334220	Cellular handsets (cell phones)
334220	Wireless networking equipment
334220	Radio station equipment including satellite, airborne and earth-based (fixed and mobile)
334220	Antenna systems, sold separately
334220	Radio and TV broadcasting and wireless communications equipment, not specified by kind
334220	Radio and television broadcasting and wireless communications equipment manufacturing other miscellaneous receipts

Hardware (continued)	
NAICS	**Item Description**
334220	Radio and television broadcasting and wireless communications equipment manufacturing inventory change
334290	Alarm systems, including electric sirens and horns
334290	Vehicular and pedestrian traffic control equipment, including electric railway signals and attachments
334290	Intercommunications systems, including inductive paging systems (selective paging), except telephone and telegraph
334290	Other communications equipment, not specified by kind
334290	Other communications equipment manufacturing other miscellaneous receipts
334290	Other communications equipment manufacturing inventory change
334310	Home, portable, and automobile radios and radio-phonograph-tape recorder-compact disc combinations
334310	Television receivers, including combination models
334310	Public address systems, including musical instrument amplifiers
334310	Speakers, including loudspeakers systems and loudspeakers sold separately, and commercial sound equipment
334310	Consumer audio and video equipment, including audio and video recorders and players (camcorders) and Power amplifiers, including preamplifiers
334310	Audio and video equipment, not specified by kind, total
334310	Audio and video equipment manufacturing other miscellaneous receipts
334310	Audio and video equipment manufacturing inventory change
334412	Bare printed circuit board manufacturing
334412	Bare printed circuit board manufacturing other miscellaneous receipts
334412	Bare printed circuit board manufacturing inventory change
334413	Semiconductor and related device manufacturing
334413	Semiconductor and related device manufacturing other miscellaneous receipts
334413	Semiconductor and related device manufacturing inventory change
334416	Capacitor, resistor, coil, transformer, and other inductor manufacturing other miscellaneous receipts
334416	Capacitors for electronic circuitry
334416	Capacitor, resistor, coil, transformer, and other inductor manufacturing inventory change
334416	Resistors for electronic circuitry
334416	Electronic coils, transformers, and other inductors
334416	Electronic coil, transformer, and other inductor manufacturing other miscellaneous receipts
334416	Electronic coil, transformer, and other inductor manufacturing inventory change

Hardware (continued)	
NAICS	**Item Description**
334417	Electronic connectors
334417	Electronic connector manufacturing other miscellaneous receipts
334417	Electronic connector manufacturing inventory change
334418	External modems, consumer
334418	Printed circuit assemblies, loaded boards and modules (printed circuit boards with inserted electronic components)
334418	Printed circuit assembly (electronic assembly), not specified by kind, total
334418	Printed circuit assembly (electronic assembly) manufacturing other miscellaneous receipts
334418	Printed circuit assembly (electronic assembly) manufacturing inventory change
334419	Electron tube manufacturing other miscellaneous receipts
334419	Electron tube manufacturing inventory change
334419	Electron tubes and parts, excluding glass blanks
334419	Other electronic component manufacturing
334419	Other electronic component manufacturing other miscellaneous receipts
334419	Other electronic component manufacturing inventory change
334611	Software reproducing
334611	Software reproducing other miscellaneous receipts
334611	Software reproducing inventory change
334612	Reproduction of audio discs, records, and compact discs
334612	Reproduction of recording media, not specified by kind
334612	Audio discs, records, and compact discs (CD), full-length
334612	Audio tapes, cassette, full-length
334612	Reproduction of video recording media
334612	Reproduction of audio tapes
334612	Prerecorded compact disc (except software), tape, and record reproducing other miscellaneous receipts
334612	Prerecorded compact disc (except software), tape, and record reproducing inventory change
334613	Magnetic tape
334613	Optical disks
334613	Rigid magnetic disks

Hardware (continued)	
NAICS	**Description**
334613	Flexible magnetic discs and other recording media, including parts
334613	Magnetic and optical recording media manufacturing other miscellaneous receipts
334613	Magnetic and optical recording media manufacturing inventory change
33592M	Fiber optic cable for communication, not specified by kind, total
33592M	Fiber optic cable, communication applications
33592M	Fiber optic cable, all other applications
33592M	Power wire and cable, made from nonferrous metals (purchased wire)
33592M	Electronic wire and cable, made of nonferrous metals (purchased wire)
33592M	Telephone and telegraph wire and cable, made of nonferrous metals (purchased wire)
33592M	Other communication and energy wires, not specified by kind, total
33592M	Communication and energy wire and cable manufacturing other miscellaneous receipts
33592M	Communication and energy wire and cable manufacturing inventory change
335999	Semiconductor battery chargers, automotive
335999	Semiconductor battery chargers, industrial and railroad
335999	Semiconductor high-voltage power supplies in excess of 2 kV
335999	All other AC to DC semiconductor power conversion and rectifying apparatus (except for electronic circuitry)
339930	Other electronic toys and games, including home video games (excluding cartridges, disks, and tapes)
54170A	For sale auxiliary scientific research and development (taxable), semiconductor and other electronic component manufacturing
54170A	For sale auxiliary scientific research and development (taxable), other computer and electric product manufacturing
54170N	For sale academic scientific research and development (tax exempt), semiconductor and other electronic component manufacturing
54170N	For sale academic scientific research and development (tax exempt), other computer and electric product manufacturing
54170N	For sale scientific research and development (tax exempt), semiconductor and other electronic component manufacturing
54170N	For sale scientific research and development (tax exempt), other computer and electric product manufacturing
54170P	For sale scientific research and development (taxable), semiconductor and other electronic component manufacturing
54170P	For sale scientific research and development (taxable), other computer and electric product manufacturing
54170P	Own account scientific research and development (taxable), semiconductor and other electronic component manufacturing
54170P	Own account scientific research and development (taxable), other computer and electric product manufacturing

Software	
NAICS	**Item Description**
511210	Application software publishing (other than games)
511210	System software publishing
511210	Game software publishing
511210	Software related technical support services
511210	Licensing of rights to reproduce and distribute computer software
511210	Inventory change for software publishers
541511	Own-account software

Business-to-Business E-Commerce	
NAICS	**Item Description**
425110	Wholesale trade margin output, business to business electronic markets
425110	Wholesale trade nonmargin output, business to business electronic markets

Business-to-Consumer E-Commerce	
NAICS	**Item Description**
454111	Retail trade margin, electronic shopping
454112	Non-margin retail trade, electronic auctions

Cloud Services, Paid	
NAICS	**Item Description**
511210	Game software publishing
511210	Software related technical support services
511210	Licensing of rights to reproduce & distribute computer software
511210	Inventory change for software publishers
518210	Business process management services (includes provision of facility)
518210	Application service provisioning, website hosting, and other IT infrastructure provisioning services (includes collocation and streaming services)
518210	Data management, processing, storage, and information and document transformation services
51821A	Auxiliary data processing services
541410	Interior design services (except sales of products)
541410	Sales of products specified as part of an integrated interior design service
541420	Industrial design services
541430	Graphic design services
541490	Other specialized design services
541511	Custom computer programming
541511	Own-account software
541512	Computer systems design services
541513	Computer facilities management services
541519	Other computer related services

All Other Priced Digital Services	
NAICS	**Item Description**
512110	Licensing of rights to distribute, exhibit, broadcast, or rent audiovisual works and licensing of rights for merchandising, use of concepts, and other uses of audiovisual works
512110	Audiovisual works sold directly to the consumer, including digital downloads
515110	Air-time sales for the broadcasting of radio program content
515110	Licensing of rights to broadcast radio programs
515120	Air-time sales for the broadcasting of television program content
515120	Licensing of rights to broadcast television programs
515120	Public and non-commercial programming services - TV (includes contributions, gifts, and grants)
515210	Licensing of rights to distribute specialty television or audio programming content
517110	Basic fixed local telephony (other than telecom resellers) - (Includes subscriber line and calling feature charges)
517110	Internet telephony
517110	Force account, telephone equipment installation
517110	Basic fixed long distance and all distance telephony (other than telecom resellers)
517110	Licensing of rights to use intellectual property of wired telecom carriers
517110	Multichannel programming distribution services (analog and digital) (includes startup and reconnect fees)
517110	Private network services (other than satellite telecom)
517110	Carrier services (other than satellite telecom) - (Includes network access and Internet backbone services)
517110	Broadband (always on) internet access services
517210	Mobile local, all distance and long-distance telephony (other than telecom resellers) - (Includes mobile telephony calling feature charges)
517210	Licensing of rights to use intellectual property of wireless telecom carriers
517210	Paging, mobile dispatch, and specialized wireless services
517410	Satellite telecommunications services - (includes carrier services and private network services of satellite telecommunications)
517911	Basic fixed local telephony (provided by telecommunications resellers) - (Includes subscriber line and calling feature charges)
517911	Basic fixed long distance and all distance telephony (provided by telecommunications resellers)
517911	Licensing of rights to use intellectual property of telecom resellers
517911	Mobile telephony services (provided by telecommunications resellers) - (Includes mobile telephony calling feature charges)
517919	Narrowband (dial-up) internet access services and other telecommunications services
517919	Licensing of rights to use intellectual property of all other telecommunications

All Other Priced Digital Services (continued)	
NAICS	**Item Description**
518210	Business process management services (includes provision of facility)
518210	Application service provisioning, website hosting, and other IT infrastructure provisioning services (includes collocation and streaming services)
518210	Data management, processing, storage, and information and document transformation services
51821A	Auxiliary data processing services
519110	Licensing of rights to syndicated media content
519130	Internet publishing and broadcasting - subscriptions and sales
519130	Licensing of rights to use intellectual property of internet publishers and broadcasters
541511	Custom computer programming
541512	Computer systems design services
541513	Computer facilities management services
541519	Other computer related services
61142N	Expenses of computer training schools (tax exempt)
61142N	Tax exempt receipts from sales of computer training schools (tax exempt)
61142P	Computer training schools (taxable)
61142P	Outright sale of original works of intellectual property of computer training schools (taxable)
61142P	Licensing of rights to use intellectual property of computer training schools (taxable)
61159P	Other technical and trade schools (taxable)
811210	Consumer electronics repair and maintenance
811210	Computer and office machine repair and maintenance
811210	Communications equipment repair and maintenance

These items are partially included in the BEA digital economy estimates.

Business-to-Business E-Commerce	
NAICS	**Item Description**
423100	Wholesale trade margin, automobile and other motor vehicle
423100	Wholesale trade margin, motor vehicle supplies and new parts
423100	Wholesale trade margin, tire and tube
423100	Wholesale trade margin, motor vehicle parts (used)
423200	Wholesale trade margin, furniture
423200	Wholesale trade margin, home furnishing
423300	Wholesale trade margin, lumber, plywood, millwork, and wood panel
423300	Wholesale trade margin, brick, stone, and related construction material
423300	Wholesale trade margin, roofing, siding, and insulation material
423300	Wholesale trade margin, other construction material
423400	Wholesale trade margin, photographic equipment and supplies
423400	Wholesale trade margin, office equipment
423400	Wholesale trade margin, computer and computer peripheral equipment and software
423400	Wholesale trade margin, other commercial equipment
423400	Wholesale trade margin, medical, dental, and hospital equipment and supplies
423400	Wholesale trade margin, ophthalmic goods
423400	Wholesale trade margin, other professional equipment and supplies
423500	Wholesale trade margin, metal service centers and other metal
423500	Wholesale trade margin, coal and other mineral and ore
423600	Wholesale trade margin, electrical apparatus and equipment, wiring supplies, and related equipment
423600	Wholesale trade margin, household appliances, electric housewares, and consumer electronics
423600	Wholesale trade margin, other electronic parts and equipment
423700	Wholesale trade margin, hardware
423700	Wholesale trade margin, plumbing and heating equipment and supplies (hydronics)
423700	Wholesale trade margin, warm air heating and air-conditioning equipment and supplies
423700	Wholesale trade margin, refrigeration equipment and supplies

Business-to-Business E-Commerce (continued)	
NAICS	**Item Description**
423800	Wholesale trade margin, construction and mining (except oil well) machinery and equipment
423800	Wholesale trade margin, farm and garden machinery and equipment
423800	Wholesale trade margin, industrial machinery and equipment
423800	Wholesale trade margin, industrial supplies
423800	Wholesale trade margin, service establishment equipment and supplies
423800	Wholesale trade margin, transportation equipment and supplies (except motor vehicle)
423900	Wholesale trade margin, sporting and recreational goods and supplies
423900	Wholesale trade margin, toy and hobby goods and supplies
423900	Wholesale trade margin, recyclable material
423900	Wholesale trade margin, jewelry, watch, precious stone, and precious metal
423900	Wholesale trade margin, other miscellaneous durable goods
424100	Wholesale trade margin, printing and writing paper
424100	Wholesale trade margin, stationery and office supplies
424100	Wholesale trade margin, industrial and personal service paper
424200	Wholesale trade margin, drugs and druggists' sundries
424300	Wholesale trade margin, piece goods, notions, and other dry goods
424300	Wholesale trade margin, men's and boys' clothing and furnishings
424300	Wholesale trade margin, women's, children's, and infants' clothing and accessories
424300	Wholesale trade margin, footwear
424400	Wholesale trade margin, general line grocery
424400	Wholesale trade margin, packaged frozen food
424400	Wholesale trade margin, dairy product (except dried or canned)
424400	Wholesale trade margin, poultry and poultry product
424400	Wholesale trade margin, confectionery
424400	Wholesale trade margin, fish and seafood
424400	Wholesale trade margin, meat and meat product
424400	Wholesale trade margin, fresh fruit and vegetable
424400	Wholesale trade margin, other grocery and related products

Business-to-Business E-Commerce (continued)	
NAICS	**Item Description**
424500	Wholesale trade margin, grain and field bean
424500	Wholesale trade margin, livestock
424500	Wholesale trade margin, other farm product raw material
424600	Wholesale trade margin, plastics materials and basic forms and shapes
424600	Wholesale trade margin, other chemical and allied products
424700	Wholesale trade margin, petroleum bulk stations and terminals
424700	Wholesale trade margin, petroleum and petroleum products (except bulk stations and terminals)
424800	Wholesale trade margin, beer and ale
424800	Wholesale trade margin, wine and distilled alcoholic beverage
424900	Wholesale trade margin, farm supplies
424900	Wholesale trade margin, book, periodical, and newspaper
424900	Wholesale trade margin, flower, nursery stock, and florists' supplies
424900	Wholesale trade margin, tobacco and tobacco product
424900	Wholesale trade margin, paint, varnish, and supplies
424900	Wholesale trade margin, other miscellaneous nondurable goods

Business-to-Consumer E-Commerce	
NAICS	**Item Description**
441110	Retail trade margin, new car dealers
441120	Retail trade margin, used car dealers
441210	Retail trade margin, recreational vehicle dealers
441222	Retail trade margin, boat dealers
441228	Retail trade margin, motorcycle, ATV, and all other motor vehicle dealers
441310	Retail trade margin, automotive parts and accessories stores
441320	Retail trade margin, tire dealers
442110	Retail trade margin, furniture stores
442210	Retail trade margin, floor covering stores
442290	Retail trade margin, window treatment stores
442290	Retail trade margin, all other home furnishings stores
443141	Retail trade margin, household appliance stores
443142	Retail trade margin, electronics stores
444110	Retail trade margin, home centers
444120	Retail trade margin, paint and wallpaper stores
444130	Retail trade margin, hardware stores
444190	Retail trade margin, other building material dealers
444210	Retail trade margin, outdoor power equipment stores
444220	Retail trade margin, nursery, garden center, and farm supply stores
445100	Retail trade margin, supermarkets and other grocery (except convenience) stores
445100	Retail trade margin, convenience stores
445210	Retail trade margin, meat markets
445220	Retail trade margin, fish and seafood markets
445230	Retail trade margin, fruit and vegetable markets
445291	Retail trade margin, baked goods stores
445292	Retail trade margin, confectionery and nut stores
445299	Retail trade margin, all other specialty food stores
445310	Retail trade margin, beer, wine, and liquor stores

Business-to-Consumer E-Commerce (continued)	
NAICS	**Item Description**
446110	Retail trade margin, pharmacies and drug stores
446120	Retail trade margin, cosmetics, beauty supplies, and perfume stores
446130	Retail trade margin, optical goods stores
446190	Retail trade margin, food (health) supplement stores
446190	Retail trade margin, all other health and personal care stores
447100	Retail trade margin, gasoline stations with convenience stores
447100	Retail trade margin, other gasoline stations
448110	Retail trade margin, men's clothing stores
448120	Retail trade margin, women's clothing stores
448130	Retail trade margin, children's and infants' clothing stores
448140	Retail trade margin, family clothing stores
448159	Retail trade margin, clothing accessories stores
448159	Retail trade margin, other clothing stores
448210	Retail trade margin, shoe stores
448310	Retail trade margin, jewelry stores
448320	Retail trade margin, luggage and leather goods stores
44XXXX	Retail trade margin, secondary production of another industry
451110	Retail trade margin, sporting goods stores
451120	Retail trade margin, hobby, toy, and game stores
451130	Retail trade margin, sewing, needlework, and piece goods stores
451140	Retail trade margin, musical instrument and supplies stores
451210	Retail trade margin, book stores
451210	Retail trade margin, news dealers and newsstands
452111	Retail trade margin, department stores (except discount department stores)
452112	Retail trade margin, discount department stores
452910	Retail trade margin, warehouse clubs and supercenters
452990	Retail trade margin, all other general merchandise stores
453110	Retail trade margin, florists

Business-to-Consumer E-Commerce (continued)	
NAICS	**Item Description**
453210	Retail trade margin, office supplies and stationery stores
453220	Retail trade margin, gift, novelty, and souvenir stores
453310	Retail trade margin, used merchandise stores
453910	Retail trade margin, pet and pet supplies stores
453920	Retail trade margin, art dealers
453930	Retail trade margin, manufactured (mobile) home dealers
453991	Retail trade margin, tobacco stores
453998	Retail trade margin, all other miscellaneous store retailers (except tobacco stores)
454113	Retail trade margin, mail-order houses
454210	Retail trade margin, vending machine operators
454310	Retail trade margin, fuel dealers
454390	Retail trade margin, other direct selling establishments