Methodology Supplement: Experimental Super Intelligence Economic Statistics, 2024[1]

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1. The U.S. Bureau of Economic Analysis (BEA) is updating its communications to incorporate the term "super intelligence,'' pursuant to the September 29, 2026, executive order directing executive branch agencies to replace the term "artificial intelligence" with "super intelligence."

1. Introduction

This document details the methodology for the U.S. Bureau of Economic Analysis (BEA) experimental statistics of the U.S. super intelligence (SI) economy, released in November 2026. The statistics include estimates of the SI economy's contribution to gross domestic product (GDP) and gross output for 2023 and 2024. Section 2 of this paper explains general national economic accounting concepts used to develop BEA's official federal statistics, and section 3 describes the data and methods used to develop the experimental SI economy statistics.

2. National Accounting Concepts

This section explains the national accounting concepts used to develop the economic statistics that form the framework for the SI economy statistics. The methods used to develop value added (also known as GDP) and gross output described in this section come from BEA methodologies *NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts* and *Concepts and Methods of the U.S. Input-Output Accounts* (BEA 2024, 2009). Concepts that are significant to the SI economy statistics are highlighted in this section, including research and development (R&D), own-account software, construction expenditures, and margins.

BEA statistics are generally consistent with the *System of National Accounts (SNA)*, which serves as the internationally accepted set of guidelines for the compilation of national economic accounts. BEA's National Income and Product Accounts (NIPAs) consist of a set of integrated accounts that provide statistics on the monetary value and sources of economic activity produced in the United States and the distribution of incomes that production generates. The supply and use tables (SUTs), sometimes called input-output tables, detail the flows of goods and services (products) purchased by each industry, the incomes earned from production in each industry, and the distribution of sales for each product.[2] SUTs data decompose industry output for the entire U.S. economy into more than 5,300 distinct product categories, typically presented in matrix form. The fine, product-level detail of these data provides insight into the internal workings of the U.S. economy by showing the contribution of specific industries and products to gross output and value added. The NIPAs and SUTs can be used to trace the principal economic flows among the major sectors of the economy.

The U.S. Census Bureau is the primary data provider for both the NIPAs and the SUTs. The Economic Census contains most of the essential data required for the SUTs—such as receipts, inventories, and payrolls—and the data are collected at the level of the smallest operating unit, the "establishment." The Economic Census reflects data for U.S. business establishments with employees and payrolls and those without employees and payrolls (nonemployers).

2. BEA categorizes industries using the North American Industry Classification System (NAICS), which groups establishments based on the similarity of their production processes. NAICS organizes economic activity into broad sectors and more detailed subsectors or industries.

2.1 Gross Domestic Product

Gross domestic product measures the market value of the goods, services, and structures produced within the nation's economy in a given period. Conceptually, GDP can be measured three separate ways: (1) as the sum of goods and services sold to final users, (2) as the sum of income payments and other costs incurred in the production of goods and services, and (3) as the sum of the value added at each stage of production. The third way to measure GDP is known as the value-added or production approach. Value added is defined as the difference between an industry's gross output (sales or receipts plus other operating income and inventory change) and its intermediate inputs (goods and services that are used in the production of other goods and services). When value added is aggregated across all industries in the economy, industry sales to and purchases from each other cancel out, and the remainder is industry sales to final users, or GDP. The SUTs serve as both the data source and the framework used to estimate GDP under the production approach, which is the approach used to develop the SI economy estimates.

2.2 Gross Output

Gross output is a measure of output or production activity that consists of sales or receipts and other operating expenses, commodity taxes, and inventory change. It reflects both the value of goods and services that are used in other production processes (intermediate inputs) and the value of goods and services purchased by end-use consumers (final products). Gross output is sometimes referred to as "gross duplicated domestic output" because it inherently double-counts the industry output that is purchased by other industries and used as inputs for their production. In contrast, GDP counts only industry sales to final users, so it is considered a "nonduplicative" measure of production in the economy. Using the production approach to measure GDP in practice, value added is calculated as the residual from an industry's gross output less its intermediate inputs.

To illustrate the difference between gross output and value added, consider a new car shipped from an auto assembly plant. The car reflects not only the costs and profit associated with final assembly of the car commodity but also the costs and profit associated with all stages of production that preceded final assembly. At an earlier stage, the tires that were put on that car were recorded as output of the tire plant and reflected the costs and profit associated with their manufacturer. Thus, in gross output, the value of the tires is counted twice—once in the value of the auto manufacturer's output and once in the value of the tire manufacturer's output. Furthermore, including the value of the rubber and metal that were shipped to the tire plant would constitute triple counting, and so on. In contrast, in the measurement of automobile industry value added, the value of the tires shipped to the assembly plant represents an intermediate input and is therefore subtracted from the value of the shipments of completed cars from the assembly plant.

2.3 Selected Topics in National Accounting

R&D. R&D production consists of expenditures for the discovery or development of new products, of improvements to existing products, and of new or more efficient processes of production. These estimates are primarily based on R&D expenditures data from three annual surveys from the National Science Foundation (NSF) National Center for Science and Engineering Statistics (NCSES): the Business Enterprise Research and Development (BERD) Survey, the Annual Business Survey, and the Higher Education Research and Development Survey.

Own-account production. Own-account investment is a form of production in which establishments produce fixed assets for themselves rather than purchasing them from another establishment. For example, a business engages in own-account investment if it develops or improves its own software rather than purchasing custom-made software from a software-development company. Own-account production is not captured as a market transaction, so BEA estimates its value using a sum of production costs approach. Production costs include compensation (wage and nonwage) of employees, the costs of intermediate inputs, and a BEA-derived measure of capital services (including depreciation) related to the production of the own-account investment. The estimates of wages for all years are derived by multiplying the number of select occupations associated with software development in each industry by the wage rate for that industry.[3] Wages are reduced using occupation-based time-use factors for own-account software development under the assumption that these occupations spend only a portion of their time working on the development of new or enhanced own-account software. The data on employment by industry and the data on wages by occupation are from the U.S. Bureau of Labor Statistics (BLS) Occupational Employment and Wage Statistics (OEWS) program. The estimates of nonwage compensation are based on relationships between wage and nonwage compensation derived from NIPA data by industry. The estimates of input costs are based on relationships between intermediate inputs and compensation that are derived primarily from the Census Bureau's Economic Census.

Own-account software does not include the development of software originals from which copies are made for sale or incorporated into other products (such as motor vehicles or appliances); these are instead included in R&D.

Construction. Construction estimation relies on the Census Bureau's Value of Construction Put in Place (VIP) Survey. The VIP measures activity by collecting reports from the owners of the construction projects monthly (reported on a monthly and aggregated annual basis) and aims to capture the amount of construction activity accomplished on a project within a month. The VIP also captures several important components of construction activity such as nonemployer construction, architectural and

3. Software-development occupations include computer programmers, software developers, software quality assurance analysts and testers, computer systems analysts, web developers and digital interface designers, database administrators and architects, network and computer systems administrators, computer network architects, and computer and information research scientists.

engineering costs, own-account construction, and homeowner construction. This is a divergence from traditional collection methods of construction activity that rely on contractor estimations of the value of work accomplished, augmented by permits and sales data. The traditional approach risks misstating the distribution of construction output across the time series and has the potential for double-counting. For example, in cases where businesses perform work as subcontractors for other construction companies rather than directly for the entities that are investing in the new structure. By collecting estimates on a project basis, the VIP avoids these pitfalls.

Margins. Trade margins, or markups, reflect the value added by wholesalers and retailers in the distribution of a commodity from producers to final purchasers. Trade margins are the wholesale and retail costs of marketing goods or services to users, separate from the value of the commodities they distribute. Trade margins estimate the value added of having the wholesaler or retailer involved in the chain of distribution from the producer to the final purchaser. Transportation margins consist of those transport costs paid separately by the purchaser in taking delivery of goods.

Current-dollar estimates. The market values and imputations used to measure GDP and other economic statistics are in current dollars—that is, they reflect transactions in terms of their value in the periods in which they take place. For many analyses, it is useful to separate the changes in current-dollar GDP that are due to changes in quantity from those that are due to changes in price to remove the influence of inflation. In the NIPAs, the featured measure of growth in the U.S. economy is the percent change in real GDP—that is, the quantity-change measure for GDP from one period to another. For the SI economy statistics, only current-dollar estimates are available due to a lack of source data on prices related to SI production.

3. Measuring the SI Economy

The SI economy statistics were built using BEA's comprehensive SUTs. The goal of the experimental SI statistics is to highlight SI production and spending that is already present in the SUTs but is spread across various industries. In practice, the new statistics are a rearrangement of BEA's SUTs to isolate just SI production. For example, the SI statistics show the value of SI software produced in the United States, while the SUTs show the value of all software produced in the United States, regardless of the type.

The experimental SI statistics followed the same methodology as other supplemental statistics developed by BEA, sometimes referred to as thematic accounts, including statistics on the digital economy and outdoor recreation economy. There are three main steps to developing thematic account estimates: identify relevant products within BEA's SUTs, separate economic activity within products as necessary, and then use the SUTs to determine total economic activity by industry. Identifying relevant product categories to include in the SI statistics requires a solid definition of SI.

3.1 Determining Scope

There are many existing definitions of SI, though most were not developed for the purposes of economic measurement. In general, many definitions mention both hardware and software components needed for computing (Highfill, Wasshausen, and Prunchak 2025). BEA uses the Census Bureau's definition for SI, which is "computer systems and software that are able to perform tasks normally requiring human intelligence" (U.S. Census Bureau 2026).[4] To develop a comprehensive estimate of the SI economy, BEA consulted subject matter experts and reviewed existing research, ultimately determining that the SI economy encompasses the production, distribution, and deployment of SI. This translates to the following components being included in the SI economy statistics: R&D, cloud services, software, construction of data centers, consultancy and engineering services, and servers and storage manufacturing (table 1). These SI products correspond to just under 60 product categories in the SUTs.

4. The Census Bureau, along with the NCSES, began collecting data on the use of SI by industry in the 2019 Annual Business Survey.

Table 1. Measuring Super Intelligence Production

SI products	Primary producing industries	Data sources used to isolate SI production in the SUTs
Research and development	Multiple industries	• National Center for Science and Engineering Statistics (NCSES) Survey of Federal Funds for Research and Development • NCSES Business Enterprise Research and Development Survey • Networking and Information Technology Research and Development Program
Cloud services	Information	• Market reports • Public financial filings
Software	Information and professional and business services	• International Data Corporation (IDC) Worldwide Semiannual Software Tracker • U.S. Bureau of Labor Statistics (BLS) Occupational Employment and Wage Statistics (OEWS) • Public financial filings • Market reports
Construction of data centers	Construction	• U.S. Census Bureau Value of Construction Put in Place Survey
Consultancy and engineering services	Professional and business services	• Market reports • BLS OEWS
Servers and storage	Manufacturing	• IDC Worldwide Quarterly AI Infrastructure Tracker

AI Artificial intelligence
SI Super intelligence
SUTs Supply and use tables

U.S. Bureau of Economic Analysis

3.2 Data and Methods

There are no product categories in the SUTs dedicated solely to SI, so alternative data sources were used to estimate the share of each product category's gross output attributable to SI, listed in table 1. Typically, data showing SI sales revenue or a close equivalent was used to find the SI share. As a simplified example, if the source data indicated 50 percent of a product category's revenue was due to SI, BEA included in the SI statistics 50 percent of the product category's gross output across all the industries that produce it (a similar process was done to estimate the associated value added). The data and methods used to estimate the SI share for each product category are summarized below. BEA also indicates which North American Industry Classification System (NAICS) sectors or industries produce the products, corresponding to the experimental SI economy data tables.

R&D estimates conducted by the private sector were based on spending data from the NSF NCSES. The NCSES publishes a Business Enterprise Research and Development Survey table, "Companies with domestic R&D paid for by the company and others and performed by the company in the super intelligence technology focus area, by industry and company size." This table breaks down performance by the company's primary industry. The data show SI R&D spending occurred in all major NAICS industries, though it was concentrated in the information and manufacturing sectors. The "paid for by the company" column is used for values of all private own-account R&D output items. The NCSES survey for SI R&D describes SI as:

> "A branch of computer science and engineering devoted to making machines intelligent. Intelligence is that quality that enables an entity to perceive, analyze, determine response and act appropriately in its environment.
>
> Systems with artificial intelligence perform functions including, but not limited to, speech recognition, machine vision, or machine learning:
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> - Speech recognition transforms human speech into a format useful for computer applications (for example, a digital assistant)
> - Machine vision uses sensors and software that allow images to be used as an input for computer applications (for example, systems that sort or inspect objects or support navigation in mobile equipment)
> - Machine learning uses statistical software and data to "learn" and make better predictions without reprogramming (for example, recommender systems for websites, or sales and demand forecasting)
>
> Artificial Intelligence technologies also include virtual agents, deep learning platforms, decision management systems, biometrics, text analytics, and natural language generation and processing" (NCSES and U.S. Census Bureau 2026).

The NCSES data are reported on a company-level basis, so adjustments were made to reflect establishment-level R&D to be consistent with BEA's GDP by industry estimates. Establishments are economic units, generally at a single physical location, where business is conducted or where services or industrial operations are performed. Establishments are classified into an industry on the basis of their principal production method. Because large multiestablishment companies typically contain establishments that are classified in different industries, the industrial distribution of the same economic activity on an establishment basis can differ significantly from that on a company basis. For example, SI R&D spending by a manufacturing company that occurs at a separate R&D campus will show up in the NCSES data in the manufacturing industry, but in BEA's GDP by industry data, it will show up within the professional and business services sector within the miscellaneous professional, scientific, and technical services industry.

Cloud services estimates were mainly derived from publicly available financial filings for hyperscalers. Data from these reports were aggregated into the International Data Corporation (IDC) report, "Worldwide Public Cloud Software Market Shares, 2024" (2025). The IDC report delineates cloud services revenue into different areas, including Software as a Service (SaaS) and Platform as a Service (PaaS). Cloud PaaS delivers and facilitates SI services (i.e., running the models quickly, at scale) and is considered investment, tantamount to software. Cloud services compute is excluded because it's considered an intermediate input into R&D, software production, and other areas and is therefore inherently captured in the production of those products. The SI portion of the relevant cloud services (SaaS and PaaS) was isolated by taking the average value from various industry market reports. Cloud services production is concentrated in the information sector.

Software estimates in the SI statistics were derived primarily using IDC Worldwide Semiannual Software Tracker (2026a) data that shows revenue for SI platforms. SI platforms fall under application development and deployment software and include SI life cycle (SI build, machine learning operations and foundation model operations, data labeling, and trustworthy SI), SI software services (including computer vision SI, conversational SI, and generative SI), and search and knowledge discovery software. Software production occurs chiefly in the professional and business services sector and the information sector.

As opposed to traditional software, which is considered a standalone investment, the value of embedded software is considered part of the final product it is embedded in. SI software is embedded in manufactured goods, especially robots, drones, and cars. BEA isolates the embedded value of SI software for these products using a method similar to how own-account software is valued (i.e., sum of production cost, described in section 2). The number of relevant software occupations is adjusted by a time-use factor to isolate the share of time they spend doing tasks associated with embedded software development (taken from the residual of the own-account software time-use factor), times a national wage rate. The SI share of software for these products was taken from various industry reports. Embedded software production occurs in the manufacturing sector.

Construction of data centers estimates were based on data from the Census Bureau that show spending on data center construction (VIP Survey). Reliable source data on the portion of data centers built specifically for SI could not be ascertained, so BEA calculated the trend from 2020 to 2022 and attributed the above-trend value of data center construction to SI.

Consultancy and engineering services represent a few areas of SI production. SI consultants are hired by firms to help with strategy, implementation, and management of SI systems. SI engineering services establish the infrastructure, workflows, governance mechanisms, and deployment frameworks necessary for production-scale SI implementation. Various industry market reports were used to estimate these shares along with information about relevant occupations from the BLS OEWS program. Consultancy and engineering services production mostly occurs in the professional and business services sector.

Server and storage manufacturing estimates were based on IDC Worldwide Quarterly AI Infrastructure Tracker (2026b) data that show revenue for "AI-centric" computer hardware deployed in the United States.[5] In the IDC data, an "AI-centric" server runs any of these types of applications: SI platforms dedicated to SI application development, SI applications whose prime function is to execute SI models, SI-enabled applications with some SI functionality, and SI application development and deployment software used to develop SI models and applications. Manufacturing of chips and related components that are intermediate inputs to servers and storage manufacturing are inherently captured in the value of these products.

To account for imported SI hardware in the AI infrastructure tracker data, auxiliary data from IDC was received with detailed information about domestic computer hardware production by U.S. companies. BEA took the SI shares for U.S.-based companies from the AI infrastructure tracker data and weighted those shares by the value of U.S. production provided in the auxiliary spreadsheet to calculate domestic SI hardware production.

5. SI accelerators and other components embedded in final demand products that are not classified as SI products, such as cars, phones, and laptops, are considered outside the scope of these experimental statistics due to a lack of source data and consensus on treatment.

Government production is typically measured in terms of government spending via budget documents or other public information. The White House's Office of Science and Technology Policy publishes annual data on government R&D spending on SI through their Networking and Information Technology Research and Development Program. Since this spending includes payment to the private sector that should already be captured in the NCSES BERD survey, BEA uses Survey of Federal Funds for Research and Development data that shows intramural shares by agency to isolate the own-account (government) share of SI R&D.

Wholesale trade in the SI statistics consists mostly of the margins related to the trade of SI servers and storage. Wholesale trade margins are calculated using the same SI share applied to the manufactured good in which the margins apply. As a simplified example, if 5 percent of server production was found to be attributable to SI, then 5 percent of the wholesale margins for servers reported in the SUTs were included in the SI estimates within the wholesale trade sector.

3.3 Conclusion

BEA's experimental SI statistics were developed using a variety of data sources and techniques owing to a lack of comprehensive government data relating specifically to the production of SI. The experimental statistics described in this report therefore reflect an initial starting point for measuring the economic impact of SI on the U.S. economy. BEA expects to update and improve on these statistics subject to available data and resources. Please send feedback or suggestions about the methodology to SuperIntelligence@bea.gov.

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