

## 2019 Annual Business Survey (ABS) Instructions

Please respond for the business named in the address label or survey. Report for your company's domestic U.S. operations only, including all majority-owned U.S. subsidiaries, unless instructed otherwise. Carefully prepared estimates are acceptable if book figures are not readily available.

You are able to save and log out of your account at any time. Your responses will be saved and you are able to log back into the survey, and complete more responses at a later time. In addition, the survey will navigate you to the next applicable question. You may not be asked to complete all the questions included in these instructions. This guide is for select survey questions only.

To report online:

1. **Sign-in** or **Register** at <https://portal.census.gov>
2. **Add** your authentication code found in the letter you received from Census and NSF.
3. **Report** by clicking on "REPORT NOW." You can return to your account over multiple sessions to complete.
4. For assistance completing this survey, please log-in to your Census Bureau account at <https://portal.census.gov> and send us a secure message or call the customer help line at 1-888-824-9954, Monday through Friday, 8:30 a.m. to 6:00 p.m. Eastern time.
5. Please visit How Do I Get Started? <https://www.census.gov/programs-surveys/abs/information/get-started.html> for additional information.
6. Please visit How-To Videos <https://www.census.gov/programs-surveys/economic-census/technical-documentation/how-to-videos.html> for information on Logging into the Respondent portal.
7. Please visit Information for Respondents <https://www.census.gov/abshelp> and click on one of the links in the "Questionnaires" section to see a worksheet containing all of the questions on the ABS. This worksheet is for informational purposes only and should not be filled out.

The ABS collects information from all kinds of businesses, and the survey contains sections that may not apply to your business. The online reporting tool will guide you to the questions for which responses are required. Depending on the size of your business, you may need to collaborate with colleagues in different departments to complete different sections of the survey. For more information, visit the “**How Do I Share Survey Access?**” section within the respondent portal.

Instructions are provided for select questions, identifiable by their screen titles, within the following sections of the survey:

- Section A: Company Information
- Section B: Owner Characteristics
- Section C: Products and Processes
- Section D: Research and Development
- Section E: Technology and Intellectual Property
- Section F: Contact Information

Not all of the questions in the ABS are necessarily applicable to your business. The online survey will guide you to appropriate questions based on your responses. The question by question instruction guide below states each time a skip will occur given a certain answer.

Each question is listed by Section letter, an Owner designation (within Section B only), followed by a Question number. For example, **A.2** denotes the second question in Section A; and **B.2.1** denotes the first question in Section B, which asks for the characteristics of the *Owner #2*.

## Section A. Company Information

### A.1 Ceased Operations

Question: “**A.1 Has this business ceased operations?**”

Completion of the 2018 ABS is required even if this business or its owner(s) ceased business operations due to a court-approved bankruptcy, reorganization, or liquidation plan.

If the business ceased operations *before* 2018, select “Yes,” and respond to the **A.2 Date Ceased Operations** question to report the date that business operations ceased.

Otherwise, select “No,” and continue with the survey.

If another entity acquired or merged with this business during or after 2018, report for the part of 2018 that this business was in operation prior to its acquisition or merger. If the business’s name has changed, please complete the entire survey regardless of when the change took place. You may type the new business name and an explanation of what has occurred in the closing “**Remarks**” screen that appears before you submit the survey.

### A.3 Business Ownership – Foreign-Owned Entity

Question: “**A.3 In 2018, was this business a majority-owned subsidiary of a foreign company?**”

Special reporting instructions apply if this business was majority-owned by a foreign entity (company or government) not created or organized in the United States.

All direct and indirect ownership interests held by the foreign entity in this business in 2018 should be summed to determine whether the foreign entity’s percentage of ownership was more than fifty percent.

When answering the remaining questions, report for the foreign entity’s U.S.-based operations only, which includes all majority-owned U.S. subsidiaries/divisions located in the United States in 2018, unless explicitly instructed otherwise. For reporting purposes, the foreign parent and/or any other foreign affiliate, which was not owned by the U.S. subsidiary/division, should be treated the same as any business partner, customer, or supplier that the U.S.-based operations does not own.

If the U.S.-based subsidiary/division pays its foreign parent for R&D services or if the foreign parent pays or reimburses its U.S.-based subsidiary/division for R&D services, those costs should be included when responding to questions in **Section D: Research and Development**.

Report this business’s information by using U.S. generally accepted accounting principles (U.S. GAAP) as recognized by the Financial Accounting Standard Board (FASB). If your company follows International Financial Reporting Standards (IFRS), please estimate any adjustments that would be required to conform to U.S. GAAP.

#### **A.4 Business Ownership – U.S. Entity**

Question: **“A.4 In 2018, did another U.S. company or other entity own more than 50 percent of this business?**

***Examples of other entities include estates, trusts, employee stock ownership plans (ESOPs), associations, membership clubs, and cooperatives.”***

Responses to this question help to eliminate double counting in cases where both parties in a business acquisition receive this survey, and to identify business that were majority-owned by another business(es), or created or organized legal entity(ies) in 2018.

If you answer “Yes,” the survey will automatically skip to the **A.6 Business - 10% or More Ownership** question.

#### **A.5 Business Ownership – Government or Tribal Entity**

Question: **“A.5 In 2018, was this business owned by a government or tribal entity?”**

Select “Yes” to report on behalf of a government agency, or a federally or state -recognized Indian Nation (variously called a tribe, nation, band, pueblo, community, rancheria, or native village).

Select “No” to respond for a self-employed person, or a nontribal-owned business, regardless of the owner’s or owners’ American Indian and Alaska Native enrolled or principal tribal affiliations.

#### **A.6 Business - 10% or More Ownership**

Question: **“A.6 In 2018, did at least one person own 10% or more of this business?**

***Do not count parent companies, estates, trusts, or other entities.”***

For this survey, the word “person” refers to a human owning rights, claims, interests, or stock in this business in 2018; and does not refer to ownership by another business, or a created or organized legal entity.

### **A.7 Number of Owners**

Question: **“A.7 In 2018, how many people owned this business?”**

- ***Do not combine two or more owners to create one owner.***
- ***Count spouses and partners as separate owners.”***

Report the number of people that directly owned the rights, claims, interests, or stock in this business in 2018. For this survey, sole proprietors and self-employed people are considered owners of independent businesses. If you are the sole proprietor or self-employed, you should report “1 person” (or “2 people” if you owned the business jointly with your spouse in 2018.)

Select “1 person” in situations where different companies, plus one individual person, held the ownership interests in this business in 2018.

Select “11 or more people” when the majority ownership in 2018 was dispersed among large numbers of owners, members, or shareholders, for example, a large publicly traded company, a civic association, a cooperative, a country club, a credit union, or a trade association.

Select “Don’t know,” if no individual person(s) owned the business in 2018; for example, an ownership by a holding company or a nonprofit organization operating a commercial business.

### **A.8 Number of W-2 Paid Domestic Employees or Employee/Owners**

Question: **“A.8 For the pay period including March 12, 2018, how many people worked for this business, including those paid through grants?”**

**Include both full-time and part-time employees as well as yourself. Include only persons in the U.S.**

**Count each person only once. If none, report zero.”**

Please count each person only once, and report the total number of owners (in line a) and employees (in line b) who worked for this business during the pay period including March 12, 2018, and were issued a 2018 W-2 form for full- or part-time employment, or other compensation. Report owners and employees from domestic operations only.

If a person was at one point an owner, and at one point an employee, please count them as whatever they were on March 12, 2018.

### **A.9 Number of Domestic Workers Who Did Not Receive a W-2**

Question: **“A.9 Not including employees or employee/owners included in the previous question how many other people worked for this business, including paid through grants? Include both full-time and part-time workers as well as yourself, if applicable. Include only persons in the U.S.**

***Count each person only once. If none, report zero.”***

Please report the number of non W-2 workers (such as contractors, subcontractors, independent contractors, outside consultants, and temporary workers), who worked during the pay period including March 12, 2018. These workers may have been issued a 2018 IRS Form 1099 or were compensated by another third party business such as a consulting firm or staffing agency. In addition, report non-employees from domestic operations only.

If an employee is solely commission based and did not receive a W-2, include them in this question regardless of the amount of commissions made.

### **A.10 Total Worldwide Sales and Revenues**

Question: **“A.10 What was the amount of this business’s worldwide sales and operating revenues, including grants, during 2018?**

***Round to the nearest one thousand dollars. If none, report zero.”***

Report total worldwide sales and operating revenues from this business. If this business is a subsidiary or division of a foreign parent, report sales to its parent and other affiliates not owned by this business.

Exclude non-operating income such as dividends and interest as well as excise, sales, and other revenue-based taxes.

For sole proprietors, this amount is equal to that reported on line 3 of IRS Form 1040, Schedule C (receipts or sales net of returns and allowances).

### **A.11 Domestic Sales and Revenues**

Question: **“A.11 How much of the <response generated from the A.10 Total Worldwide Sales and Operating Revenues question> in 2018 sales, revenue, and grants, was attributable to or originated from domestic operations?**

***Include sales and operating revenues to foreign customers, including foreign subsidiaries.”***

**REPORTING INSTRUCTIONS:** For example, a U.S. manufacturing corporation sells parts to customers around the world, however, because all of its operations are located inside the United States it reports all of its sales in this question.”

If the business had no foreign operations, then the response should be 100%. This question does not refer to customers located in the United States, but sales and revenue generated from operations in the United States. If this business is owned by a foreign parent, then sales to the parent and those affiliates not owned by this business should be included.

Include sales and operating revenues to foreign customers, including foreign subsidiaries, when those sales and revenue are generated from U.S. operations.

Licensing revenue, including software licensing, should be assigned to the country where the corresponding intellectual property is owned.

Example: U.S. Manufacturing Corporation sells parts to customers around the world. However, because all of its operations are located inside the United States, it reports 100% of its sales in this question.

### **A.12 Types of Customers**

Question: **“A.12 In 2018, which of the following types of customers accounted for 10% or more of this business’s total sales of goods and/or services? *Select all that apply.*”**

While your business may have many different types of customers, each customer should fall into one category. For example, one customer cannot fit both of the “Other businesses” AND “Other organizations” categories.

### **A.13 Types of Workers**

Question: **“A.13 In 2018, which of the following types of workers were used by this business? *Select all that apply.*”**

While your business may have many different types of workers, each worker should fall into one category. For example, one worker cannot fit both of the “Leased employees” AND “Contractors, subcontractors...” categories. More than one category may be selected. Please include all of your W-2 and non-W-2 workers when answering this question.

**A.14 Primary Business Activity**

Question: **“A.14 Describe this business’s primary business activity during 2018.”**

This question requests a brief description of the type of business activity primarily performed by this business.

## Section B. Owner Characteristics

The ABS is one of the only sources of statistics about the owner characteristics of approximately 6 million U.S. employer businesses. This information has been proven useful in helping to understand changes taking place in our dynamic and growing economy. In addition to comparing business owner demographics, the results will help to summarize changes in business performance and highlight conditions of business success and failure, as well as compare minority-/nonminority-, women-/men-, and veteran-/nonveteran-owned businesses.

The ethnicity and race categories listed on the ABS are consistent with those mandated by the Office of Management and Budget (OMB). Both the Executive and Legislative Branches of the Federal Government developed these standards.

Based on information reported in **Section A: Company Information**, you may be asked to complete **Section B. Owner Characteristics** by providing the characteristics for up to four people (1-4) owning this business in 2018. In this section, each question is listed by Section letter, an Owner designation (1-4 or an X variable, as applicable), followed by a Question number.

### **B.1 Percent Ownership**

Question: “**B.1 For the person(s) owning the largest percentage(s) in this business in 2018, please list each person’s name and percentage owned.**

- *Do not report percentages owned by parent companies, estates, trusts, or other entities*
- *If more than 4 people owned this business equally, select any 4 people*
- *Round percentages to whole numbers. For example, report 1/3 ownership as 33%.*”

This question asks how much each owner owns of this business, as a percent of total ownership. The four owners with the greatest stake in the business should report. The percentages do not need to total to 100%, but should not exceed 100%.

If there are no people who own at least 10% of this business (for example, if this business is owned fully by a parent company) please return to the **A.6 Business - 10% or More Ownership** question and select “No.” The survey will subsequently skip this section entirely.

#### **B.1-4.1 Sex**

Question: “**B.X.1 What is the sex of Owner X?**”

This question asks for one selection to describe the sex of the owner.

### **B.1-4.2 Ethnicity**

Question: “**B.X.2 Is *Owner X* of Hispanic, Latino, or Spanish origin?**”

The definition of a person of Hispanic, Latino, or Spanish origin is a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.

### **B.1-4.3 Race** [Includes B.2.3, B.3.3, and B.4.3.]

Question: “**B.X.3 What is *Owner X*’s race? *Select all that apply. (For this survey, Hispanic origins are not races.)***”

Race categories are defined as:

White. A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

Black or African American. A person having origins in any of the black racial groups of Africa, including those who consider themselves to be “Haitian.”

American Indian or Alaska Native. A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.

Asian. A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.

Native Hawaiian or Other Pacific Islander. A person having origins in any of the original peoples of Hawaii, Guam, Mariana Islands, Samoa, or other Pacific Islands.

### **B.1-4.4 Military Service**

Question: “**B.X.4 Has *Owner X* ever served in any branch of the U.S. Armed Forces, including the Coast Guard, the National Guard, or a Reserve component of any service branch?**”

Please note that the above options are not all-inclusive, and include prior and current military service. If this question is answered “No,” the survey will automatically skip to the **B.X.7 Initial Acquisition Year** question.

#### **B.1-4.5 Military Service Disability**

Question: **“B.X.5 Is *Owner X* disabled as the result of illness or injury incurred or aggravated during military service?”**

Mark the "Yes" box if the person has a Department of Veterans Affairs (VA) service -connected disability rating.

#### **B.1-4.6 Other Military Service**

Question: **“B.X.6 Do any of the following characteristics describe *Owner X*'s military service? Select all that apply.”**

This question asks about more details on *Owner X*'s service. If none of the options pertain to the owner, please select “None of the above.”

#### **B.1-4.7 Initial Acquisition Year**

Question: **“B.X.7 In what year did *Owner X* initially acquire ownership of this business?”**

This question asks what year *Owner X* acquired the business. This includes but is not limited to creating the business, buying the business, and inheriting the business.

#### **B.1-4.8 Primary Income Source**

Question: **“B.X.8 In 2018, did this business provide *Owner X*'s primary source of personal income?”**

This question asks if this business supplied most of *Owner X*'s personal income, i.e. the highest source of income. If another venture other than the business named in the address label or survey was more profitable for *Owner X*, please answer “No” to this question.

#### **B.1-4.9 Prior Business Ownership**

Question: **“B.X.9 Not including the business discussed in this questionnaire, what is the status of the business *Owner X* started most recently?”**

This question only refers to a business that the owner started, not one that he or she may have purchased. For example, if an owner started a business in 1990 and bought a business in 1995, this question refers to the business started in 1990.

**B.1-4.10 Education Prior to Owning the Business**

Question: “**B.X.10** Prior to establishing, purchasing, or acquiring this business, what was the highest degree or level of school *Owner X* completed?”

- **Less than high school / secondary school graduate**
- **High school / secondary school graduate - Diploma or GED**
- **Technical, trade, or vocational school**
- **Some college, but no degree**
- **Associate Degree (for example, AA, AS)**
- **Bachelor’s Degree (for example, BA, BS)**
- **Master’s Degree (for example, MA, MEng, Med, MSW, MBA)**
- **Doctorate Degree (for example, PhD, EdD)**
- **Professional Degree, beyond a Bachelor’s Degree (for example, MD, DDS, DVM, LLB, JD)”**

Report schooling completed in foreign or ungraded schools as the equivalent level of schooling in the typical American school system. If the owner has not completed any college courses for credit, mark the highest level completed below the college level.

For the **Professional Degree beyond a Bachelor’s Degree** category, do not include certificates or diplomas for training in specific trades or occupations such as computer and electronics technology, medical assistant, or cosmetology. Do not include post-bachelor’s certificates that are related to occupational training in such fields as teaching, accounting, or engineering.

#### **B.1-4.11 Field of Highest Degree Prior to Owning the Business**

Question: “**B.X.11** Prior to establishing, purchasing, or acquiring this business, what was the field of the highest degree completed for *Owner X*? *Select all that apply.*”

- Biological, agricultural and environmental life sciences
- Chemistry, except biochemistry
- Computer and mathematical sciences and other technology and technical fields
- Earth, atmospheric and ocean sciences
- Economics, political science, psychology, sociology and other social sciences
- Engineering
- Health
- Physics and astronomy
- Science and mathematics teacher education
- Other science and engineering related fields, not listed above
- Art and humanities fields
- Education, except science and math teacher education
- Management and administration fields
- Sales and marketing fields
- Social service and related fields
- Other non-science and non-engineering related fields, not listed above”

Please indicate the Owner’s highest degree only. The degree field chosen here should correspond to the highest degree selected in the previous question.

#### **B.1-4.12 AGE**

Question: “**B.X.12** What was the age of *Owner X* as of December 31, 2018?”

This question asks the age of the owner on December 31, 2018.

#### **B.1-4.13 Place of Birth**

Question: “**B.X.13** Was *Owner X* born in the United States?”

“United States” refers to the fifty states and the District of Columbia, excluding foreign countries, and the U.S. territories and various possessions.

Please answer this question and the **B.X.14 PLACE OF BIRTH** question. Data will be used only for statistical purposes and responses will be summarized to fully protect the confidentiality of individual respondents and their businesses.

#### **B.1-4.14 U.S. Citizenship**

Question: **“B.X.14 Is *Owner X* a citizen of the United States?”**

“A citizen of the United States” refers to a person who is either (1) a citizen born in the United States; (2) a citizen born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas; (3) a citizen born abroad of U.S. citizen parent or parents; or (4) a U.S. citizen by naturalization (the legal act or process by which a noncitizen in a country may acquire citizenship or nationality of that country).

Please answer this question and the **B.1.X.13 CITIZENSHIP** question. Data will be used only for statistical purposes and responses will be summarized to fully protect the confidentiality of individual respondents and their businesses.

#### **B.1-4.15 REASONS FOR OWNING THE BUSINESS**

Question: **“B.X.15 How important to *Owner 1* are each of the following reasons for owning this business? *Select one (Very Important / Somewhat Important / Not at all Important) for each row.***

- **Wanted to be my own boss**
- **Flexible hours**
- **Balance work and family**
- **Opportunity for greater income**
- **Best avenue for my ideas/goods/services**
- **Unable to find employment**
- **Working for someone else didn’t appeal to me**
- **Always wanted to start my own business**
- **An entrepreneurial friend or family member was my role model**
- **Wanted to carry on the family business**
- **Wanted to help and/or become more involved in my community**
- **Other”**

Indicate the level of importance you consider for each row. If the reason provided is not applicable, please select “Not at all Important.” By selecting “Very Important” or “Somewhat Important” in the row for **Other**, you are asked to describe the reason in the space provided.

## **Section C. PRODUCTS AND PROCESSES**

The following section collects information on the business's introduction of a new or improved products (goods or services) or business process that differed significantly from the business's previous products or processes.

The products or business processes must have characteristics or intended uses that are new or which provide a significant improvement over what was previously used or sold by the business. However, they can fail or take time to prove themselves.

The products or business processes need only be new or improved for the business. It could have been originally developed or used by other businesses or organizations.

The following section asks about the three year period 2016 to 2018 instead of one year as in other sections of this survey.

### **C.1 New or Improved Goods or Services**

Question: “**C.1 During the three years 2016 to 2018, did this business introduce to the market any new or improved goods or services that differed significantly from the business’s previous goods or services? Select one (Yes or No) for each row.**

- a. **Goods. (Exclude the simple resale of new goods and changes of a solely aesthetic nature.)** A good is usually a tangible object such as a smartphone, furniture, or packaged software, but also include digital goods such as downloadable software, music and film.
- b. **Services. (Exclude the simple resale of new services.)** A service is usually intangible, such as retailing, insurance, educational courses, air travel, consulting, etc., and also includes digital services.”

This question asks whether the business introduced any new goods and services (a.k.a. products) or any improved products during the time frame of 2016 to 2018. A new or improved good or service should differ significantly from the business’s previous goods and services and it should have been introduced to the market although it need not be considered commercially successful. The minimum requirement for a new good or service is that it must have one or more characteristics that are significantly different from those contained in goods or services previously offered by or used by the business. These characteristics must be relevant to the business or to external users. This includes significant improvements in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics. Significant improvements to existing products can occur through changes in materials, components and other characteristics that enhance performance.

If “No” is selected for both answers, the survey will automatically skip to the **C.5 Process Innovation** question.

### **C.2 Novelty of New or Improved Goods or Services**

Question: “C.2 During the three years 2016 to 2018, did this business introduce any new or improved goods or services that were:

- a. New to the market? This business introduced a new or improved product (good or service) that was not previously offered by any of your competitors (it may have already been available in other markets)
- b. New only to this business? This business introduced a new or improved product (good or service) that was identical or very similar to products already offered by your competitors

*Select one (Yes or No) for each row.”*

This question asks about introduction of a product (goods or services) that are new or improved and differed significantly from the business’s previous products (goods or services) with respect to its characteristics or intended uses (products can be goods or services). Improved products must be new to this business, but they do not need to be new to the market. These products could have been originally developed by this business or by other businesses.

The emphasis of this question is on “new to the market” or “new only to the business.” This question addresses the novelty of a company’s new or improved products in comparison with the state of the art in the market or industry in which the firm operates.

### **C.3 New or Improved Goods or Services as a Percent of Total Sales**

Question: “C.3 Using the definitions in the previous question, what percentage of this business’ sales and revenues were attributable to or originated from domestic operations:

- a. New or improved goods and services introduced during 2016 to 2018 that were new to your market.
- b. New or improved goods and services introduced during 2016 to 2018 that were new only to this business.
- c. Goods and services that were unchanged or only marginally modified during 2016 to 2018 (include the resale of new goods or services purchased from other companies)”

This question asks how much of the business’s total sales in 2018 are attributable to different types of products (products can be goods or services) that are new or improved and differed significantly from the business’s previous products. Specifically, it asks what percent of the business’s total sales in 2018 was from these new or improved products that were new to the market as a whole, the percent of sales from new or improved products that were only new to the business (the same distinction made in the previous question), and the percent of sales from products that were not new. The three answers to this question should total to 100%.

#### **C.4 Sources of New or Improved Goods or Services**

Question: **“C.4 Who developed these new or improved products (goods and services)? For other businesses, include independent businesses. Organizations include universities, research institutes, nonprofits, etc. Select all that apply.**

- **This business by itself**
- **This business together with other businesses or organizations**
- **This business by adapting or modifying products originally developed by other businesses or organizations**
- **Other businesses or organizations”**

This question asks for the source of the business’s new or improved products (products can be goods or services). Although a company may have many sources of innovations for its products, the source of each new or improved products should fit into one category. If an innovation was made by ‘adapting or modifying products originally developed by other businesses,’ then even if the business solely worked on the innovation, option three (“by adapting or modifying products originally developed by other businesses or organizations”) should still be selected over option one (“by itself”).

### **C.5 New or Improved Business Processes**

**Question: “C.5 During the three years 2016 to 2018, did this business introduce any of the following types of new or improved business processes that differ significantly from your previous business processes? *Select one (Yes or No) for each row.***

- a. Methods for producing goods or providing services (including methods for developing goods or services)**
- b. Logistics, delivery or distribution methods**
- c. Marketing methods for promotion, packaging, pricing, product placement or after sales services**
- d. Information and communication systems (including hardware, software and data processing)**
- e. Administration and management activities (including decision-making human resource management, and methods for accounting or other administrative operations)**
- f. Product and business process development activities (including activities to identify, develop or adapt products or processes)”**

This question asks about the implementation of any production or delivery methods (processes) that are new or improved and differed significantly. This includes but is not limited to significant changes in techniques, equipment and/or software. An improved process can for example be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products.

If “No” is selected for all answers, the survey will automatically skip to the **C.7 Innovation Activities** question.

### **C.6 Improved Business Process Developers**

Question: **“C.6 Who developed these new or improved business processes? *For other businesses, include independent businesses. Organizations include universities, research institutes, nonprofits, etc. Select all that apply.***

- **This business by itself**
- **This business together with other businesses or organizations**
- **This business by adapting or modifying business processes originally developed by other businesses or organizations**
- **Other businesses or organizations”**

This question asks for the source of the business’s new or improved processes. Although a company may have many sources for its new or improved processes, each source should fit into one category. If new or improved process was made by ‘adapting or modifying products originally developed by other businesses,’ then even if the business solely worked on the innovation, option three (“by adapting or modifying process originally developed by other businesses or organizations”) should still be selected over option one (“by itself”).

### **C.7 Activities for New or Improved Products or Business Processes**

Question: **“C.7 During the three years 2016 to 2018, did this business have any of the following types of innovation activities?**

***Include all developmental, financial and commercial activities that were intended to result in a new or improved product or business process that differed significantly from your previous products or processes. Select one (Yes or No) for each row.***

Activities that this question are interested in include, but are not limited to, the acquisition of machinery, equipment, buildings, software, and licenses; engineering and development work, feasibility studies, design, training, R&D and marketing when they are specifically undertaken to develop and/or implement a new or improved product or process. This includes also all types of research and development activities to create new knowledge or solve scientific or technical problems.

The prior questions were asking what new or improved products and/or processes the business developed, while this question asks about the means or activities used to develop/acquire these products and/or processes.

During the three years 2016 to 2018, did this business have any of the following types of innovation activities? Include all developmental, financial and commercial activities, which were intended to result in a new or improved product or business process that differed significantly from your previous products or processes.

- a. **Research and development**: creative and systematic work undertaken in order to increase the stock of knowledge and to devise new applications of available knowledge
- b. **Engineering and design activities**: planning of technical specifications, testing, evaluation, setup and pre-production for goods, services, processes or systems; installing equipment, tooling-up, testing, trials and user demonstrations; and activities to extract knowledge or design information from existing products or process equipment. Also includes activities to develop a new or modified function, form or appearance for goods services or processes
- c. **Marketing and brand equity activities**: include market research, market testing, methods for pricing, product placement and product promotion; product advertising, the promotion of products at trade fairs or exhibitions and the development of marketing strategies
- d. **Intellectual Property (IP) related activities**: protection or exploitation of knowledge, often created through R&D, software development, and engineering, design and other creative work, including all related administrative and legal work
- e. **Employee training**: activities that are paid for or subsidized by the firm to develop knowledge and skills required for the specific trade, occupation or vocation of a firm's employees.
- f. **Software development and database activities**: in-house development and purchase of computer software; collection and analysis of data in proprietary computer databases and data obtained from publicly-available reports or the Internet; and Activities to upgrade or expand the functions of IT systems, including computer program and databases.
- g. **Acquisition of machinery, equipment and other tangible assets**
- h. **Management related to innovation**: Activities to plan, govern and control internal and external resources"

Whereas the prior question asked what new or improved processes the business developed, this questions is asking about the means or activities used to acquire these processes.

These means or activities include, but are not limited to, the acquisition of machinery, equipment, buildings, software, and licenses; engineering and development work, feasibility studies, design, training, R&D and marketing when they are specifically undertaken to develop and/or implement a new or improved product or process. This includes also all types of research and development activities to create new knowledge or solve scientific or technical problems.

Innovation activities for new or improved product or processes are all developmental, financial and commercial activities, undertaken by a business, which are intended to or result in a new or improved product or process.

These activities have the following features:

- Businesses can perform innovation activities in-house or source goods or services for innovation activities from external organizations.
- Innovation activities may be postponed or abandoned due to multiple reasons.
- Innovation activities can create knowledge or information that is not used to introduce a new product or process. This includes knowledge from activities that fail to meet their primary innovation goals.
- Businesses can use the results of their innovation activities, including innovations, new knowledge, and new information for their own benefit, they can retain the results for their own use until a later date, or they can transfer, sell or license the results to other firms or organizations.

If “No” is selected for all options, and the total number of W-2 paid employees/owners of the business is between 1 and 9, the survey will automatically skip to **Section D: Research and Development (R&D)**.

If “No” is selected for all options, and the total number of W-2 paid employees/owners of the business is greater than or equal to 10, the survey will automatically skip to **Section E: Technology and Intellectual Property**.

#### **C.8 Activity Costs and C.9 R&D for Activity Costs**

Please note that these questions are asking for thousands of dollars, and the value you enter is multiplied by 1000. For example, if your business spent \$100,000 on the above activities, please type the number 100 as your answer, as this is registered that as \$100,000.

For question C.8, please include the dollar amount only for the innovation activities you selected yes in the innovation activities question (question C.7). Question C.9 will only appear if you said yes to the Research and Development activity (Question C.7 – option a).

## Section D. Research and Development (R&D)

**Reporting for “domestic operations”** - In this survey, “domestic operations” refers to this business’s operations located in the 50 United States and the District of Columbia. When reporting for domestic operations, include transactions with foreign subsidiaries. Include all your majority-owned subsidiaries and divisions located in the domestic United States.

**Reporting instructions for Foreign-Owned Companies** - If this business is owned by a foreign parent, the reporting unit for this survey is your U.S.-located company. For reporting purposes, this business’s foreign parent and any other foreign affiliates this business owns should be treated the same as any business partner, customer, or supplier you do not own.

If you pay this business’s foreign parent for R&D services or if this business’s foreign parent pays or reimburses this business for R&D services, those costs should be included in the response to the questions in this section.

### What is Research and Development (R&D)?

Research and development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge and to devise new applications of available knowledge. This includes:

- a) Activities aimed at acquiring new knowledge or understanding without specific immediate commercial applications or uses (basic research);
- b) Activities aimed at solving a specific problem or meeting a specific commercial objective (applied research); and
- c) Systematic work, drawing on research and practical experience and resulting in additional knowledge, which is directed to producing new products or processes or to improving existing products or processes (development).

R&D includes both direct costs such as salaries of researchers as well as administrative and overhead costs clearly associated with the company’s R&D.

The term R&D does NOT include expenditures for:

- Costs for routine product testing, quality control, and technical services unless they are an integral part of an R&D project
- Market research
- Efficiency surveys or management studies
- Literary, artistic, or historical projects, such as films, music, or books and other publications
- Prospecting or exploration for natural resources

**Does R&D include development of software and Internet applications?**

R&D activity in software and Internet applications refers only to activities with an element of uncertainty and that are intended to close knowledge gaps and meet scientific and technological needs. Report in this survey all software R&D as defined here regardless of the eventual user (internal or external).

**R&D activity in software INCLUDES:**

- Software development or improvement activities that expand scientific or technological knowledge
- Construction of new theories and algorithms in the field of computer science

**R&D activity in software EXCLUDES:**

- Software development that does not depend on a scientific or technological advance, such as
  - supporting or adapting existing systems
  - adding functionality to existing application programs, and
  - routine debugging of existing systems and software
- Creation of new software based on known methods and applications
- Conversion or translation of existing software and software languages
- Adaptation of a product to a specific client, unless knowledge that significantly improved the base program was added in that process

**Reporting unit.** The reporting unit is this business, including all subsidiaries and divisions, domestic and foreign. Include subsidiary companies where there is more than 50 percent ownership.

**Reporting period.** Report data for the calendar year 2018, if possible, or for this business's fiscal year ending between April 2018 and March 2019.

**Estimates are acceptable.** Report all items to the best of your ability.

### **D.1 R&D Activities**

Question: “D.1 During 2018, did this business do any of the following R&D activities?

*Include activities that:*

- *This business performed*
- *Others paid this business to do*
- *This business paid others to do*

*Select one (Yes or No) for each row.*

- a. Conducted activities aimed at acquiring new knowledge or understanding without specific immediate commercial applications or uses
- b. Conducted activities aimed at acquiring new knowledge for solving a specific problem or meeting a specific commercial objective
- c. Conducted systematic work, drawing on research and practical experience and resulting in additional knowledge, which is directed to producing new products or processes or to improving existing products or processes
- d. Developed and tested goods, services, or processes that were derived from scientific research or technical findings
- e. Developed software that advanced scientific or technological knowledge
- f. Produced findings that could be published in academic journals or presented at scientific conferences
- g. Applied scientific or technical knowledge in a way that has never been done before
- h. Created new scientific or technical solutions that can be generalized to other situations
- i. Conducted work to discover previously unknown technological facts, structures, or relationships
- j. Conducted work to extend the understanding of scientific facts, relationships, or principles in ways that could be useful to others”

This question asks the business to indicate whether it had any of a variety of activities considered to be research and development (R&D). Report only for the year 2018.

If “No” is selected for all options, the survey will automatically skip to **Section E: Technology and Intellectual Property**.

## **D.2 R&D Costs**

Question: **“D.2 What was the total cost (both direct and indirect) in 2018 for all the R&D activities reported as “Yes” in the ‘R&D ACTIVITIES’ question?”**

***Your best estimate is acceptable. Report dollar amount in thousands. If none, report zero.***

**Include the following costs:**

- **Salaries, wages, fringe benefits**
- **Plant, machinery, and equipment, except that which was capitalized because it had an alternative future use**
- **Materials, supplies, software**
- **Rent, utilities**
- **Consultants, contractors**
- **Depreciation expense from plant, machinery, and equipment that was capitalized because it had an alternative future use**

**Do not include:**

- **Costs for routine product testing, quality control, and technical services unless they are an integral part of an R&D project**
- **Market research**
- **Efficiency surveys or management studies**
- **Literary, artistic, or historical projects, such as films, music, or books and other publications**
- **Prospecting or exploration for natural resources”**

This question requests the total costs for this business’s R&D activities in 2018. Total R&D costs include both direct costs such as salaries of researchers as well as administrative and overhead costs clearly associated with this business’s R&D.

Include costs for R&D paid for by this business as well as costs for R&D paid for by others, such as customers or business partners. Also include payments made by this business for R&D services performed by (i) unrelated third parties, (ii) affiliates for which this business has less than a 50% ownership stake and/or (iii) this business’s foreign parent if the business is foreign-owned.

Do NOT include capital expenditures, regardless of their relation to R&D, in your response to this question.

This question is asking for thousands of dollars, and the value entered, will be multiplied by \$1,000. For example, if this business spent \$100,000 in total cost for R&D activities, please type “100” as your answer, as this is registered that as \$100,000.

### **D.3 Foreign R&D Costs**

Question: **“D.3 During 2018, what amount, if any, of the ‘D.2 R&D COSTS’ was performed by businesses outside the U.S.?”**

This question asks how much of the business’s R&D was performed by any businesses not directly located in the United States. A foreign-owned parent of the business is classified as a business outside of the U.S., and any funds directed to the parent for R&D purposes should be included in the answer to this question.

This question is asking for thousands of dollars, and the value entered, will be multiplied by \$1,000. For example, if this business spent \$100,000 in total cost for foreign R&D activities, please type “100” as your answer, as this is registered that as \$100,000.

### **D.4 Domestic R&D Costs**

Question: **“D.4 We’ve calculated this business’s domestic R&D costs by subtracting the amount entered for R&D costs outside the U.S. from all R&D costs. This value will be used in other questions in this questionnaire.**

**This business’s domestic R&D cost in 2018 is <the result of subtracting D.3 Foreign R&D Costs (performed by businesses outside the U.S.) from D.2 R&D Costs (total cost for all R&D activities)>.”**

This number is calculated and displayed on the screen. It is determined by subtracting the answer provided in Foreign R&D Costs. If the calculated value is incorrect, please revisit the **D.2 R&D Costs** and/or **D.3 Foreign R&D Costs** questions, and adjust your answer(s) accordingly.

### **D.5 Types of R&D Costs**

Question: “**D.5 During 2018, how much of the <calculated D.4 Domestic R&D Costs> in domestic R&D costs was for each of the following types of costs?**

- a. **Salaries, wages, and fringe benefits**
- b. **Expensed machinery and equipment (not capitalized)**
- c. **Materials and supplies**
- d. **Payments to others for R&D, including purchased R&D services**
- e. **Depreciation on R&D property and equipment**
- f. **All other costs (for example, consultants, contractors, travel, rent)”**

This question is asking you to provide a breakdown of the total costs for the business’s domestic R&D activities in 2018. Total R&D costs include both direct costs such as salaries of researchers as well as administrative and overhead costs clearly associated with the business’s R&D.

Include costs for R&D paid for by this business as well as costs for R&D paid for by others such as customers or business partners. Also include payments made by this business for R&D services performed by (i) unrelated third parties, (ii) affiliates for which this business has less than a 50% ownership stake and/or (iii) this business’s foreign parent if this business is foreign-owned.

Do NOT include capital expenditures, regardless of their relation to R&D, in your response to this question.

Please note that this question is asking for thousands of dollars, and the value you enter is multiplied by 1000. For example, if your business spent \$100,000 on foreign R&D costs, please type the number 100 as your answer, as this is registered that as \$100,000.

### **D.6 R&D Domestic Performance Costs**

Question: “**D.6 This number is calculated and displayed on the screen. It is determined by subtracting the payments for R&D services from domestic R&D costs. This value will be used in the next question.**

**This business's domestic R&D performance costs in 2018 is <the result of subtracting D.5 Types of R&D Costs - d. Payments to others for R&D, including purchased R&D services from D.4 Domestic R&D Costs>.”**

Another way to understand this value is the “R&D costs that weren’t involved in hiring other people or businesses to perform R&D.” This dollar amount is useful for understanding difference in how this business performed its own in-house research versus out-of-house research that was contracted.

If the calculated value seems incorrect, please revisit the **D.4 Domestic R&D Costs** and/or **D.5 Types of R&D Costs - d. Payments to others for R&D, including purchased R&D services** questions, and adjust your answer(s) accordingly.

**If D.6 = 0, skip to D.9**

#### **D.7 Funding Sources for R&D Activities**

Question: “**D.7 During 2018, of the <value calculated for D.6 R&D Domestic Performance Costs> in total R&D domestic performance costs, how much was paid for by the following sources?**

- a. **This U.S. business**
- b. **Your foreign owner (if the business is foreign owned)**
- c. **Other businesses located within the U.S.**
- d. **Other businesses located outside the U.S.**
- e. **Universities or colleges located within the U.S.**
- f. **Nonprofit organizations located within the U.S.**
- g. **U.S. Federal government (including R&D grants)**
- h. **U.S. State or Local government (not including state universities)**
- i. **All other organizations outside the U.S.”**

This question asks the business to report how much of its R&D was paid for by different types of organizations. In the case of sub-contracting agreements, report the original source of funding.

Example: Company Sub Inc. performs custom software development for a large defense company as a subcontractor on a U.S. Department of Defense (DOD) contract. Even though Company Sub Inc. is working directly for the defense company, it should include this cost in line G because the DOD was the original source of funds.

Please note that this question is asking for thousands of dollars, and the value you enter is multiplied by 1000. For example, if your business spent \$100,000 on foreign R&D costs, please type the number 100 as your answer, as this is registered that as \$100,000.

## **D.8 R&D Categories**

Question: “**D.8 During 2018, of the <value calculated for D.6 R&D Domestic Performance Costs> in R&D domestic performance costs, how much was for the following categories?**

- a. **Basic research** – activities aimed at requiring new knowledge or understanding without specific immediate commercial applications or uses
- b. **Applied research** – activities aimed at solving a specific problem or meeting a specific commercial objective
- c. **Development** – systematic work, drawing on research and practical experience and resulting in additional knowledge, which is directed to producing new products or processes or to improving existing products or processes”

Research is defined as experimental or theoretical work undertaken primarily to acquire new knowledge or understanding of phenomena and observable facts. Research may be either “basic”, where the goal is primarily to acquire new knowledge or understanding of a given topic without a specific commercial application in mind, or “applied”, where the goal is to solve a specific problem or meet a specific commercial objective.

Development is defined as the systematic use of research and practical experience to produce new or improved goods, services, or processes. In simple terms, the intended output of research is ideas and the intended output of development is products.

For example, a project that aims to investigate the influence of different materials on fuel cell efficiency would be classified as basic research. A project that aims to improve fuel cell efficiency using new materials would be classified as applied research.

The total must equal 100%.

### **D.9 R&D Employees**

Question: **“D.9 For the pay period including March 12, 2018, how many employees from this business’s domestic operations, were R&D employees and how many were all other employees? *Include owners who receive a W-2. If none, report zero.***

**R&D employees include** all employees who work on R&D or who provide direct support to R&D, such as researchers, R&D managers, technicians, clerical staff, and others assigned to R&D groups.

**Exclude** employees who provide only indirect support to R&D, such as corporate personnel, security guards, and cafeteria workers.

Previously, you indicated this business had <total value calculated for A.8 Number of W-2 Paid Domestic Employees or Employee/Owners> W-2 employees and owner/employees.

- a. How many of those employees and owner/employees were R&D employees?
- b. Of the R&D employees, how many were female?
- c. Of the R&D employees, how many were male?”

This question asks the business to report its total R&D employees based on their sex. The total of lines b. and c. should equal line a.

### **D.10 R&D Employee Occupations**

Question: “**D.10 Of the** <response generated from **D.9 R&D Employees, line a.**> **R&D employees, how many were?**

*If none, report zero.*

- a. Researchers (including R&D scientists, engineers, and their managers)**
- b. R&D technicians and equivalent staff**
- c. R&D support staff (clerical and other)**
- d. Total R&D employees**
- e. Of the researchers reported in line a how many had PhDs?”**

The distinction between the different occupation categories is defined primarily by the nature of the employee’s work, not the employee’s level of education. Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management if the projects concerned. Include R&D managers in the “Researchers” category.

R&D technicians and equivalent staff are persons whose main tasks require technical knowledge and experience in one or more fields of science or engineering, but who contribute to R&D by performing technical tasks under the supervision of researchers. Biostatisticians supporting clinical trials should be reported in this category even though they may hold PhDs in their field.

The main distinction between researchers and technicians is that researchers contribute more to the creative aspects of R&D whereas technicians provide technical support. As a simple example, a researcher (scientist or engineer) would design an experiment and a technician would run the experiment and assist in analyzing results.

R&D support staff are employees not directly involved with the conduct of a research project, but support the researchers and technicians. These employees might include clerical staff, report writers, regulatory experts, quality assurance, safety trainers, and other related employees.

### **D.11 Domestic R&D Employees Full-Time Equivalent**

Question: “**D.10 What was the full-time equivalent of the <response generated from D.9 R&D Employees, line a.>?**

*For full-time R&D employees use the number of employees for the FTEs. For other full-time employees not working solely on R&D or part-time employees working on R&D use the share of full-time work week they work on R&D.”*

The headcount of full-time equivalent R&D employees should be adjusted to account for employees who work part-time as well as those employees who split their time between R&D and other activities. For example, if your business had one full-time R&D employee working 40 hours a week, and two part-time R&D employees that each worked 20 hours a week, the answer to this question would be the full-time equivalent of two ( $1 + \frac{1}{2} + \frac{1}{2}$ ) R&D employees. The purpose of this question is to accurately measure the amount of effort employees are devoting to R&D in the business sector.

### **D.12 Domestic Researchers Full-Time Equivalent**

Question: “**D.11 What was the full-time equivalent of the <response generated from D.10 R&D Employee Occupations, line a> researchers?**”

The headcount of researchers should be adjusted to account for employees who work part-time as well as those employees who split their time between R&D and other activities. For example, if your business had one full-time R&D researcher working 40 hours a week, and two part-time employees that each worked 20 hours a week on R&D research, the answer to this question would be the full-time equivalent of two ( $1 + \frac{1}{2} + \frac{1}{2}$ ) R&D researchers. The purpose of this question is to accurately measure the amount of effort researchers are devoting to R&D in the business sector.

### **D.13 Tax Credit for Research Activities**

Question: “**D.11 Did this business file for the tax credit for increasing research activities (IRS form 6765) in 2018?**”

Qualifying research expenditures as defined for this tax credit are not directly comparable to R&D expenditures collected elsewhere in this survey.

## Section E. Technology and Intellectual Property

The following section collects information on intellectual property and technology use for the business. Technology-related questions in this section asks about the following technologies:

- **Artificial Intelligence**: Artificial intelligence is 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.
- **Cloud-based Computing Systems and Applications**: Cloud systems and applications are computing resources available on-demand via the internet.
- **Specialized Software (excluding Artificial Intelligence)**: Specialized software is software dedicated to performing a particular business function.
- **Robotics**: Robotic equipment (or robots) are automatically controlled, reprogrammable, and multipurpose machines used in automated operations in industrial and service environments.
- **Specialized Equipment (excluding Robotics)**: Specialized equipment is equipment capable of automatically carrying out pre-specified task(s).

### **E.1 Intellectual Property Activities**

Question: **“E.1 Indicate whether this business did any of the following during 2018. *Select one (Yes or No) for each row.***

- a. **Transferred intellectual property (IP) to others not owned by this business through participation in technical assistance or “know-how” agreements.**
- b. **Received IP from others not owned by this business through participation in technical assistance or “know-how” agreements**
- c. **Participated in cross-licensing agreements in which two or more parties grant a license to each other for the use of the subject matter claimed in one or more of the patents owned by each party**
- d. **Allowed free use of patents or other IP owned by this business (for example, allowing free use of software patents by the open source community)**
- e. **Made use of open source patents or other freely available IP not owned by this business”**

This question asks for it performed any of a specific list of intellectual property activities in 2018.

## **E.2 Importance of Intellectual Property**

Question: “E.2 During 2018, how important were the following types of intellectual property protection to this business?”

*Select one (Very Important / Somewhat Important / Not at all Important) for each row.*

- a. Utility patents (patents for inventions)
- b. Design patents (patents for appearance)
- c. Trademarks
- d. Copyrights
- e. Trade secrets
- f. Nondisclosure agreements”

This question asks for the importance of each type of intellectual property to your business. If an option is not applicable, please select “Not at all Important.”

## **E.3 Production Technology for Goods and Services**

Question: “E.3 During the three years 2016 to 2018, to what extent did this business use the following technologies in production processes for goods or services?”

*Select one (Did not use / Tested, but did not use in production or service / Low Use / Moderate Use / High Use / Don’t know) for each technology.*

- a. Artificial Intelligence
- b. Cloud-based Computing Systems and Applications
- c. Special Software
- d. Robotics
- e. Specialized Equipment”

This question asks if any of the five technologies (Artificial Intelligence, Cloud-based Computing Systems and Applications, Specialized Software, Robotics, and Specialized Equipment) were used in production processes for either goods or services, and asks about the intensity of such use (e.g. low use, moderate use, high use).

If no technologies were used for any production processes, then the survey will skip to the **E.19 Factors Adversely Affecting Technology Adoption and Utilization** question.

For more details regarding each technology, please click on the hyperlink associated with that technology.

**E.4, E.7, E.10, E.13, E.16 Motivation for <auto filled by an E.3 Production Technology for Goods and Services, lines a. – e. technology>Technology Adoption and Utilization – Processes and Methods**

Question: “E.4, E.7, E.10, E.13, E.16 During the three years 2016 to 2018, why did this business adopt or use [one of the five technologies]? *Select all that apply.*”

- To automate tasks performed by labor
- To upgrade outdated processes or methods
- To improve quality or reliability of processes or methods
- To expand the range of goods or services
- To adopt standards and accreditation
- Some other reason”

These questions will be asked only if the business used that specific technology in production processes (if the business answered low, moderate, or high use for that technology in response to the **E.3 Production Technology for Goods and Services** question). If this is not the case, please return to the **E.3 Production Technology for Goods and Services** question and select “Did not use,” “Tested, but did not use in production or service,” or “Don’t know” for the technology.

**E.5, E.8, E.11, E.14, E.17 Impact of <auto filled by an E.3 Production Technology for Goods and Services, lines a. – e. technology>Technology on Workforce – Processes and Methods**

Questions: “E.5, E.8, E.11, E.14, E.17 During the three years 2016 to 2018, what was the effects of adopting or using [one of the five technologies] on the following?”

- A. The number of workers employed by this business
- B. The skill level of workers employed by this business
- C. The scientific, technological, engineering, and mathematical skills of workers employed by this business”

These questions will be asked only if the business used that specific technology in production processes (if the business answered low, moderate, or high use for that technology in response to the **E.3 Production Technology for Goods and Services** question). If this is not the case, please return to the **E.3 Production Technology for Goods and Services** question and select “Did not use,” “Tested, but did not use in production or service,” or “Don’t know” for the technology.

If you are unsure about any of the questions, please select “Did not change” or “Did not change overall.”

**E.6, E.9, E.12, E.15, E.18 Impact of <auto filled by an E.3 Production Technology for Goods and Services, lines a. – e. technology> On Worker Types – Processes and Methods**

Questions: “E.6, E.9, E.12, E.15, E.18 During the three years 2016 to 2018, what was the effects of adopting or using [one of the five technologies] on the following?”

- A. The number of production workers
- B. The number of nonproduction workers
- C. The number of supervisory workers
- D. The number of nonsupervisory workers”

These questions will be asked only if the business used that specific technology in production processes (if the business answered low, moderate, or high use for that technology in response to the **E.3 Production Technology for Goods and Services** question). If this is not the case, please return to the **E.3 Production Technology for Goods and Services** question and select “Did not use,” “Tested, but did not use in production or service,” or “Don’t know” for the technology.

If you are unsure about any of the questions, please select “Did not change.”

**E.19 Factors Adversely Affecting Technology Adoption and Utilization**

Questions: “E.19 During the three years 2016 to 2018, indicate which factors adversely affected the adoption or utilization of the following technologies to produce goods or services. *Select all that apply for each technology.*”

- a. Artificial Intelligence
- b. Cloud-based Computing Systems and Applications
- c. Special Software
- d. Robotics
- e. Specialized Equipment”

This question should be answered even if the business never considered using the technology (and selected “Did not use” in response to the **E.3 Production Technology for Goods and Services** question). If that is the case, select “No factors adversely affected the adoption of this technology.”

## **E.20 Technology-Based Goods and Services**

Question: “**E.20 During the three years 2016 to 2018, did this business sell the following technologies or goods or services that included the following technologies? *Select one (Yes or No) for each row.***

- a. Artificial Intelligence**
- b. Cloud-based Computing Systems and Applications**
- c. Special Software**
- d. Robotics**
- e. Specialized Equipment”**

This question asks if the business sold any of the five technologies or goods or services that included the five technologies (Artificial Intelligence, Cloud-based Computing Systems and Applications, Specialized Software, Robotics, and Specialized Equipment).

Each technology is hyperlinked with a more in-depth definition, if there is any confusion whether a technology your business sells, fits a certain category, the hyperlink is the best place to go to learn more information.

If none of the technologies were sold by the business, then the survey will skip to the **E.36 Factors Adversely Affecting Technology Production** question.

## **E.21, E.24, E.27, E.30, E.33 Motivation for <auto filled by an E.20 Technology-Based Goods and Services, lines a. – e. technology> Adoption and Utilization – Goods and Services**

Questions: “**E.21, E.24, E.27, E.30, E.33 During the three years 2016 to 2018, why did this business produce [one of the five technologies], or produce goods or services that included [one of the five technologies]? *Select all that apply.***

- To upgrade goods or services
- To expand the range of goods or services
- To enter new markets or adapt existing products to new markets
- To increase or maintain market share
- To adopt standards and accreditation
- Some other reason

This question should only be answered if the business sold that specific technology or sold goods/services that included that technology (if the business responded “Yes” for that technology in response to the **E.20 Technology-Based Goods and Services** question). If this is not the case, please return to the **E.20 Technology-Based Goods and Services** question and select “No” or “Don’t Know” for that technology.

**E.22, E.25, E.28, E.31, E.34 Impact of <auto filled by an E.20 Technology-Based Goods and Services, lines a. – e. technology> on Workforce – Goods and Services**

Questions: “**E.22, E.25, E.28, E.31, E.34 During the three years 2016 to 2018, what was the effects of producing goods or services that included [one of the five technologies] on the following?**

- A. The number of workers employed by this business**
- B. The skill level of workers employed by this business**
- C. The scientific, technological, engineering, and mathematical skills of workers employed by this business”**

These questions should only be answered if the business sold that specific technology or sold goods/services that included that technology (if the business responded “Yes” for that technology in response to the **E.20 Technology-Based Goods and Services** question). If this is not the case, please return to the **E.20 Technology-Based Goods and Services** question and select “No” or “Don’t Know” for that technology.

If you are not sure about any of the questions, please select “Did not change” or “Did not change overall.”

**E.23, E.26, E.29, E.32, E.35 Impact of <auto filled by an E.20 Technology-Based Goods and Services, lines a. – e. technology> on Worker Types – Goods and Services**

Questions: “**E.23, E.26, E.29, E.32, E.35 Indicate what effect producing [one of the five technologies], or producing goods or services that included [one of the five technologies] had on the following types of workers employed by this business during the three years 2016 to 2018.**

- A. The number of production workers**
- B. The number of nonproduction workers**
- C. The number of supervisory workers**
- D. The number of nonsupervisory workers”**

These questions should only be answered if the business sold that specific technology or sold goods/services that included that technology (if the business responded “Yes” for technology in response to the **E.20 Technology-Based Goods and Services** question). If this is not the case, please return to the **E.20 Technology-Based Goods and Services** question and select “No” or “Don’t Know” for that technology.

If you are not sure about any of the questions, please select “Did not change.”

**E.36 FACTORS ADVERSELY AFFECTING TECHNOLOGY PRODUCTION**

Question: **“E.36 During the three years 2016 to 2018, indicate which factors adversely affected the production of the following technologies or goods or services that included the technology. *Select all that apply for each technology.*”**

- a. Artificial Intelligence
- b. Cloud-based Computing Systems and Applications
- c. Special Software
- d. Robotics
- e. Specialized Equipment”

This question should be answered even if the business never considered selling the technology (and selected “No” or “Don’t Know” in response to the **E-20 Technology-Based Goods and Services** question). If that is the case, select “No factors adversely affected the adoption of this technology.”

## **Section F. Contact Information and Remarks**

### **F.1 Contact Information**

Provide the Census Bureau with a single point of contact at each business who can answer questions about survey responses, if necessary. The point of contact for this survey may differ from that provided for other Census Bureau surveys.

### **F.2 Remarks**

Please provide any additional information that would assist in understanding your reported data. This includes, but is not limited to: your relation to the owners you are reporting on, why a certain question was left blank, what you did not understand about a question, or if you wanted to report a different answer to a question but the option was not available. This section is optional and should be filled out at the business's discretion.