Welcome to the 2019 Annual Business Survey

DO NOT use this worksheet to respond to the survey, it is intended to assist with gathering and preparing data prior to reporting online. Please view the online report for specific instructions.

Return to https://portal.census.gov when you are ready to report online.

SECTION A: Company Information

The following section collects information on the operations and structure of the business. All businesses that receive this questionnaire should answer questions in the upcoming section. The reporting unit for the survey is the U.S.- located company, including all majority-owned subsidiaries and divisions regardless of location. Report only for domestic operations.

A.1 Ceased Operation

Has this business ceased operations?

☐ Yes

☐ No – Skip to A.3 Business Ownership - Foreign Entity

A.2 Date Ceased Operations

Enter the month and year this business ceased operations.

Month _____ Year _____

Reporting Instructions: If date ceased operations is before January 2018, skip to Section F: Contact Information.

If date ceased operations is between 01/2018 and 12/2019, even though this business is not currently operating, you are still required to complete the survey covering the business activity for 2018.

A.3 Business Ownership – Foreign Owned Entity

In 2018, was this business a majority-owned subsidiary of a foreign company?

☐ Yes

☐ No

Reporting Instructions for Foreign-Owned Companies: If this business is owned by a foreign parent, the reporting unit for the survey is the U.S.- located company, including all majority-owned subsidiaries and divisions located in the domestic United States (50 states and District of Columbia). For reporting purposes, the foreign parent and any foreign affiliates this company does not own should be treated the same as any business partner, customer, or supplier this business does not own.

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

☐ Yes – Skip to A.6 Business - 10% or More Ownership
☐ No

A.5 Business Ownership – Government or Tribal Entity
In 2018, was this business owned by a government or tribal entity?

☐ Yes
☐ No

A.6 Business - 10% or More Ownership
In 2018, did at least one person own 10% or more of this business? ***Do not count parent companies, estates, trusts or other entities***.

☐ Yes
☐ No - *Select "No"* ***ONLY*** *if no person owned 10% or more of this business.*

A.7 Number of Owners
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.*

☐ 1 person
☐ 2 people
☐ 3 people
☐ 4 people
☐ 5 - 10 people
☐ 11 or more people
☐ Don't know

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

	Number of People
a. Owners who received a W-2 issued by this business for salary or wages	_____
b. Employees who received a W-2 issued by this business for salary or wages	_____
Total	_____

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

Not including employees or employee/owners included in the previous question, how many other people worked for this business, including those 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.***

	Number of People
a. Individuals whose work was directed by this business who received payment in other ways (for example, contractors, consultants, temporary workers who receive a 1099 from this business or payment from another business)	_____
b. Unpaid individuals who worked for the business (for example, friends, volunteers, family members)	_____

A.10 Total Worldwide Sales and Operating Revenues

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.*

$Bil. Mil. Thou.

2018 sales, revenues, and grants $_____ ,000

Reporting Instructions: Report amount using U.S. Generally Accepted Accounting Principles (U.S. GAAP) as recognized by the Financial Accounting Standard Board (FASB). If the business follows International Financial Reporting Standards (IFRS), we request that you estimate any adjustments that would be required to conform to U.S. GAAP.

A.11 Domestic Sales and Revenues

How much of the 'A.10 Total Worldwide Sales and Operating Revenues' 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.*

$Bil. Mil. Thou.

$_____,000

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.

A.12 Types of Customers

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.***

- ☐ U.S. Federal government
- ☐ State and local government, including school districts, transportation authorities, etc.
- ☐ Other businesses, including distributors of your product(s)
- ☐ Other organizations (foreign governments, nonprofits, etc.
- ☐ Individuals

A.13 Types of Workers

In 2018, which of the following types of workers were used by this business? ***Select all that apply.***

- ☐ Full-time paid employees (workers who received a W-2)
- ☐ Part-time paid employees (workers who received a W-2)
- ☐ Paid day laborers
- ☐ Temporary staffing obtained from a temporary help service
- ☐ Leased employees from a leasing service or a professional employer organization
- ☐ Contractors, subcontractors, independent contractors, or outside consultants (workers who received a 1099 or payment from another company)
- ☐ None of the above

A.14 Primary Business Activity

Describe this business's primary business activity during 2018.

Section B: Owner Characteristics

The following section collects information on the owners of the business. Based on the number of owners you reported in the Company Information section, you may be asked to complete this section for up to four owners of the business.

Unless otherwise indicated, the reporting period for this section is calendar year 2018.

B.1 Percent Ownership

For the person(s) owning the largest percentage(s) in this business in 2018, 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%.

Name of Owner	Percentage Owned (Estimates are acceptable)

Owner 1 - If Applicable, If Not Skip To Section C.

B.1.1 Sex

What is the sex of *Owner 1*?

- ☐ Male
- ☐ Female

B.1.2 Ethnicity

Is *Owner 1* of Hispanic, Latino, or Spanish origin?

- ☐ No, not of Hispanic, Latino, or Spanish origin
- ☐ Yes, Mexican, Mexican American, Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, another Hispanic, Latino, or Spanish origin — *Enter origin below. For example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

_____

B.1.3 Race

What is *Owner 1's* race? ***Select all that apply.*** *(For this survey, Hispanic origins are not races.)*

- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native — *Enter name of enrolled or principal tribe below.*

_____

- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian — *Enter race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*

_____

- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander — *Enter race, for example, Fijian, Tongan, and so on.*

_____

B.1.4 Military Service

Has *Owner 1* 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?

- ☐ Yes
- ☐ No – Skip to Initial Acquisition Year

B.1.5 Military Service Disability

Is *Owner 1* disabled as the result of illness or injury incurred or aggravated during military service?

- ☐ Yes
- ☐ No

B.1.6 Other Military Service

Do any of the following characteristics describe *Owner 1's* military service? ***Select all that apply.***

- ☐ Served on active duty military service, not including training for the Reserves or National Guard
- ☐ Served on active duty military service after September 11, 2001
- ☐ Served on active duty military service in 2018
- ☐ Served in the National Guard or as a reservist of any branch of the U.S. Armed Forces in 2018
- ☐ None of the above

B.1.7 Initial Acquisition Year

In what year did *Owner 1* initially acquire ownership of this business?

Year	Don't know
_____	☐

B.1.8 Primary Income Source
In 2018, did this business provide *Owner 1*'s primary source of personal income?

- ☐ Yes
- ☐ No

B.1.9 Prior Business Ownership
Not including this business, what is the status of the previous business *Owner 1* started most recently?

- ☐ This is the owner's first business
- ☐ Business is still operating and Owner 1 still owns it
- ☐ Business is no longer in operation
- ☐ Business was purchased by another company
- ☐ Business was purchased by another individual

Other (specify): ↙

B.1.10 Education Prior to Owning the Business
Prior to establishing, purchasing, or acquiring this business, what was the highest degree or level of school *Owner 1* completed?

- ☐ Less than high school / secondary school graduate – Skip to AGE
- ☐ High school / secondary school graduate - Diploma or GED – Skip to AGE
- ☐ Technical, trade, or vocational school – Skip to AGE
- ☐ Some college, but no degree – Skip to AGE
- ☐ 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)

B.1.11 Field of Highest Degree Prior to Owning the Business
Prior to establishing, purchasing, or acquiring this business, what was the field of the highest degree completed for *Owner 1*? ***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

B.1.12 Age
What was the age of *Owner 1* as of December 31, 2018?

- ☐ Under 25
- ☐ 25 - 34
- ☐ 35 - 44
- ☐ 45 - 54
- ☐ 55 - 64
- ☐ 65 or over

B.1.13 Place of Birth
Was *Owner 1* born in the United States?

- ☐ Yes
- ☐ No

B.1.14 U.S. Citizenship
Is *Owner 1* a citizen of the United States?

- ☐ Yes
- ☐ No

B.1.15 Reasons for Owning the Business

How important to *Owner 1* are each of the following reasons for owning this business? ***Select one for each row.***

	Very Important	Somewhat Important	Not Important
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 a role model	☐	☐	☐
Wanted to carry on the family business	☐	☐	☐
Wanted to help and/or become more involved in my community	☐	☐	☐
Other (specify)	☐	☐	☐

_____

Owner 2 - If Applicable, If Not Skip To Section C.

B.2.1 Sex
What is the sex of *Owner 2*?
☐ Male
☐ Female

B.2.2 Ethnicity
Is *Owner 2* of Hispanic, Latino, or Spanish origin?
☐ No, not of Hispanic, Latino, or Spanish origin
☐ Yes, Mexican, Mexican American, Chicano
☐ Yes, Puerto Rican
☐ Yes, Cuban
☐ Yes, another Hispanic, Latino, or Spanish origin — *Enter origin below. For example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

_____

B.2.3 Race
What is *Owner 2's* race? ***Select all that apply.*** *(For this survey, Hispanic origins are not races.)*
☐ White
☐ Black or African American
☐ American Indian or Alaska Native — *Enter name of enrolled or principal tribe below.*

_____

☐ Asian Indian ☐ Chinese
☐ Filipino ☐ Japanese
☐ Korean ☐ Vietnamese
☐ Other Asian — *Enter race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*

_____

☐ Native Hawaiian ☐ Guamanian or Chamorro
☐ Samoan
☐ Other Pacific Islander — *Enter race, for example, Fijian, Tongan, and so on.*

_____

B.2.4 Military Service
Has *Owner 2* 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?
☐ Yes
☐ No – Skip to Initial Acquisition Year

B.2.5 Military Service Disability
Is *Owner 2* disabled as the result of illness or injury incurred or aggravated during military service?
☐ Yes
☐ No

B.2.6 Other Military Service
Do any of the following characteristics describe *Owner 2's* military service? ***Select all that apply.***
☐ Served on active duty military service, not including training for the Reserves or National Guard
☐ Served on active duty military service after September 11, 2001
☐ Served on active duty military service in 2018
☐ Served in the National Guard or as a reservist of any branch of the U.S. Armed Forces in 2018
☐ None of the above

B.2.7 Initial Acquisition Year
In what year did *Owner 2* initially acquire ownership of this business?

Year Don't know

_____ ☐

B.2.8 Primary Income Source

In 2018, did this business provide *Owner 2*'s primary source of personal income?

- ☐ Yes
- ☐ No

B.2.9 Prior Business Ownership

Not including this business, what is the status of the previous business *Owner 2* started most recently?

- ☐ This is the owner's first business
- ☐ Business is still operating and Owner 2 still owns it
- ☐ Business is no longer in operation
- ☐ Business was purchased by another company
- ☐ Business was purchased by another individual
- ☐ Other (specify):

B.2.10 Education Prior to Owning the Business

Prior to establishing, purchasing, or acquiring this business, what was the highest degree or level of school *Owner 2* completed?

- ☐ Less than high school / secondary school graduate – Skip to AGE
- ☐ High school / secondary school graduate - Diploma or GED – Skip to AGE
- ☐ Technical, trade, or vocational school – Skip to AGE
- ☐ Some college, but no degree – Skip to AGE
- ☐ 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

B.2.11 Field of Highest Degree Prior to Owning the Business

Prior to establishing, purchasing, or acquiring this business, what was the field of the highest degree completed for *Owner 2*? ***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

B.2.12 Age

What was the age of *Owner 2* as of December 31, 2018?

- ☐ ¦ yŘŜℕ нр
- ☐ 25 - 34
- ☐ 35 - 44
- ☐ 45 - 54
- ☐ 55 - 64
- ☐ 65 or over

B.2.13 Place of Birth

Was Owner 2 born in the United States?

- ☐ Yes
- ☐ No

B.2.14 U.S. Citizenship

Is *Owner 2* a citizen of the United States?

- ☐ Yes
- ☐ No

B.2.15 Reasons for Owning the Business

How important to *Owner 2* are each of the following reasons for owning this business? ***Select one for each row.***

	Very Important	Somewhat Important	Not Important
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 a role model	☐	☐	☐
Wanted to carry on the family business	☐	☐	☐
Wanted to help and/or become more involved in my community	☐	☐	☐
Other (specify)	☐	☐	☐

_____

Owner 3 - If Applicable, If Not Skip To Section C.

B.3.1 Sex
What is the sex of *Owner 3*?
- ☐ Male
- ☐ Female

B.3.2 Ethnicity
Is *Owner 3* of Hispanic, Latino, or Spanish origin?
- ☐ No, not of Hispanic, Latino, or Spanish origin
- ☐ Yes, Mexican, Mexican American, Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, another Hispanic, Latino, or Spanish origin — *Enter origin below. For example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

_____

B.3.3 Race
What is *Owner 3's* race? ***Select all that apply.*** *(For this survey, Hispanic origins are not races.)*
- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native — *Enter name of enrolled or principal tribe below.*

_____

- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian — *Enter race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*

_____

- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander — *Enter race, for example, Fijian, Tongan, and so on.*

_____

B.3.4 Military Service
Has *Owner 3* 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?
- ☐ Yes
- ☐ No – Skip to Initial Acquisition Year

B.3.5 Military Service Disability
Is *Owner 3* disabled as the result of illness or injury incurred or aggravated during military services?
- ☐ Yes
- ☐ No

B.3.6 Other Military Service
Do any of the following characteristics describe *Owner 3's* military service? ***Select all that apply.***

- ☐ Served on active duty military service, not including training for the Reserves or National Guard
- ☐ Served on active duty military service after September 11, 2001
- ☐ Served on active duty military service in 2018
- ☐ Served in the National Guard or as a reservist of any branch of the U.S. Armed Forces in 2018
- ☐ None of the above

B.3.7 Initial Acquisition Year
In what year did *Owner 3* initially acquire ownership of this business?

Year	Don't know
_____	☐

B.3.8 Primary Income Source

In 2018, did this business provide *Owner 3*'s primary source of personal income?

- ☐ Yes
- ☐ No

B.3.9 Prior Business Ownership

Not including this business, what is the status of the previous business *Owner 3* started most recently?

- ☐ This is the owner's first business
- ☐ Business is still operating and Owner 3 still owns it
- ☐ Business is no longer in operation
- ☐ Business was purchased by another company
- ☐ Business was purchased by another individual
- ☐ Other (specify): ☐

B.3.10 Education Prior to Owning the Business

Prior to establishing, purchasing, or acquiring this business, what was the highest degree or level of school *Owner 3* completed?

- ☐ Less than high school / secondary school graduate – Skip to AGE
- ☐ High school / secondary school graduate - Diploma or GED – Skip to AGE
- ☐ Technical, trade, or vocational school – Skip to AGE
- ☐ Some college, but no degree – Skip to AGE
- ☐ 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)

B.3.11 Field of Highest Degree Prior to Owning the Business

Prior to establishing, purchasing, or acquiring this business, what was the field of the highest degree completed for *Owner 3*? ***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

B.3.12 Age

What was the age of *Owner 3* as of December 31, 2018?

- ☐ Under 25
- ☐ 25 - 34
- ☐ 35 - 44
- ☐ 45 - 54
- ☐ 55 - 64
- ☐ 65 or over

B.3.13 Place of Birth

Was *Owner 3* born in the United States?

- ☐ Yes
- ☐ No

B.3.14 U.S. Citizenship

Is *Owner 3* a citizen of the United States?

- ☐ Yes
- ☐ No

B.3.15 Reasons for Owning the Business

How important to *Owner 3* are each of the following reasons for owning this business? ***Select one for each row***

	Very Important	Somewhat Important	Not Important
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 a role model	☐	☐	☐
Wanted to carry on the family business	☐	☐	☐
Wanted to help and/or become more involved in my community	☐	☐	☐
Other (specify)	☐	☐	☐

_____

Owner 4 If Applicable, If Not Skip To Section C.

B.4.1 Sex
What is the sex of *Owner 4*?
☐ Male
☐ Female

B.4.2 Ethnicity
Is Owner 4 of Hispanic, Latino, or Spanish origin?

☐ No, not of Hispanic, Latino, or Spanish origin
☐ Yes, Mexican, Mexican American, Chicano
☐ Yes, Puerto Rican
☐ Yes, Cuban
☐ Yes, another Hispanic, Latino, or Spanish origin — *Enter origin below. For example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

_____

B.4.3 Race
What is *Owner 4's* race? ***Select all that apply.*** *(For this survey, Hispanic origins are not races.)*
☐ White
☐ Black or African American
☐ American Indian or Alaska Native — *Enter name of enrolled or principal tribe below.*

_____

☐ Asian Indian ☐ Chinese
☐ Filipino ☐ Japanese
☐ Korean ☐ Vietnamese
☐ Other Asian — *Enter race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*

_____

☐ Native Hawaiian ☐ Guamanian or Chamorro
☐ Samoan
☐ Other Pacific Islander — *Enter race, for example, Fijian, Tongan, and so on.*

_____

B.4.4 Military Service
Has *Owner 4* 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?
☐ Yes
☐ No – Skip to Initial Acquisition Year

B.4.5 Military Service Disability
Is *Owner 4* disabled as the result of illness or injury incurred or aggravated during military services?

☐ Yes
☐ No

B.4.6 Other Military Service
Do any of the following characteristics describe *Owner 4's* military service? ***Select all that apply.***

☐ Served on active duty military service, not including training for the Reserves or National Guard
☐ Served on active duty military service after September 11, 2001
☐ Served on active duty military service in 2018
☐ Served in the National Guard or as a reservist of any branch of the U.S. Armed Forces in 2018
☐ None of the above

B.4.7 Initial Acquisition Year
In what year did *Owner 4* initially acquire ownership of this business?

Year	Don't know
_____	☐

B.4.8 Primary Income Source
In 2018, did this business provide *Owner 4*'s primary source of personal income?

- ☐ Yes
- ☐ No

B.4.9 Prior Business Ownership
Not including this business, what is the status of the previous business *Owner 4* started most recently?

- ☐ This is the owner's first business
- ☐ Business is still operating and Owner 4 still owns it
- ☐ Business is no longer in operation
- ☐ Business was purchased by another company
- ☐ Business was purchased by another individual
- ☐ Other (specify): ↙

B.4.10 Education Prior to Owning the Business Prior to establishing, purchasing, or acquiring this business, what was the highest degree or level of school *Owner 4* completed?

- ☐ Less than high school / secondary school graduate – Skip to AGE
- ☐ High school / secondary school graduate - Diploma or GED – Skip to AGE
- ☐ Technical, trade, or vocational school – Skip to AGE
- ☐ Some college, but no degree – Skip to AGE
- ☐ 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)

B.4.11 Field of Highest Degree Prior to Owning the Business
Prior to establishing, purchasing, or acquiring this business, what was the field of the highest degree completed for *Owner 4*? ***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

B.4.12 Age
What was the age of *Owner 4* as of December 31, 2018?

- ☐ Under 25
- ☐ 25 - 34
- ☐ 35 - 44
- ☐ 45 - 54
- ☐ 55 - 64
- ☐ 65 or over

B.4.13 Place of Birth
Was *Owner 4* born in the United States?

- ☐ Yes
- ☐ No

B.4.14 U.S. Citizenship
Is *Owner 4* a citizen of the United States?

- ☐ Yes
- ☐ No

B.4.15 Reasons for Owning the Business

How important to *Owner 4* are each of the following reasons for owning this business? ***Select one for each row.***

	Very Important	Somewhat Important	Not Important
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 a role model	☐	☐	☐
Wanted to carry on the family business	☐	☐	☐
Wanted to help and/or become more involved in my community	☐	☐	☐
Other (specify)	☐	☐	☐

_____

B.5 One Family Majority Ownership
In 2018, did **two or more members of one family own the majority** of this business? (Family refers to spouses/unmarried partners, parents/guardians, children, siblings, or close relatives).

- ☐ Yes
- ☐ No

B.6 Joint Ownership
In 2018, did spouses/unmarried partners jointly own this business?

- ☐ Yes
- ☐ No

B.7 Equal Operation
In 2018, was this business operated equally by both spouses/unmarried partners?

- ☐ Yes, equally operated by spouses/unmarried partners
- ☐ No, primarily operated by **Owner 1**
- ☐ No, primarily operated by **Owner 2**

Section C: Products and Processes

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

The products (goods or services) 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. They could have been originally developed or used by other businesses or organizations.

The following section asks about the three previous years including the calendar year 2018 instead of one year as in other sections of this questionnaire.

C.1 New or Improved Goods or Services

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 for each row.	Yes	No
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 includes digital goods such as downloadable software, music and film.	☐	☐
b. Services. (E*xclude 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.	☐	☐

If 'No' is selected for a. and b., skip to 'C-5 - Process Innovation'

C.2 Novelty of New or Improved Goods or Services

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

Select one for each row.	Yes	No
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).	☐	☐
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.	☐	☐

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

Using the definitions in the previous question, what percentage of this business's 'A.11 Domestic Sales And Revenues' in 2018 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 _____%

Total sales in 2018 100% _____

C.4 Sources of New or Improved Goods or Services

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 ☐

C.5 New or Improved Business Processes

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?

		Yes	No
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)	☐	☐

If 'No' is selected for C.5 a. – f.,and Yes is selected for C.1a or C.1b Skip to 'C.7 – Innovation Activities' If 'No' is selected for C.1a and C1.b and 'No' is selected for C.5 a.-f. Skip to Section D

C.6 Improved Business Process Developers

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 ☐

C.7 Activities for New or Improved Products or Business 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, that were intended to result in a new or improved product or business process that differed significantly from your previous products or processes.

		Yes	No
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 programs 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	☐	☐

If 'No' is selected for a. - h. and Total Number of W-2 Paid Employees or Employee/Owners from question 'A.8 Number of W-2 Paid Employees or Employee/Owners' is between 1 and 9, skip to Section D: Research and Development.

If 'No' is selected for a. - h. and Total Number of W-2 Paid Employees or Employee/Owners from question 'A.8 Number of W-2 Paid Employees or Employee/Owners' is greater than or equal to 10, skip to Section E: Technology and Intellectual Property.

C.8 Activity Costs

During 2018, how much did this business spend on the following innovation activities: Note that this question refers only to the year 2018 and not 2016 to 2018.

a. Research and development
b. Engineering and design activities
c. Marketing and brand equity activities
d. Intellectual Property (IP) related activities
e. Employee training
f. Software development and database activities
g. Acquisition of machinery, equipment and other tangible assets
h. Management related to innovation

$Mil. Thou. Dol.

Total $_____,000

If yes is selected for a. from question 'C.7 - Innovation Activities' and Total Number of W-2 Paid Employees or Employee/ Owners from question 'A.8 Number of W-2 Paid Employees or Employee/Owners' is greater than or equal to 10 and response to 'C.8 Innovation Cost' does not equal zero, continue to 'C.9 - R&D Innovation Costs'.

If response to 'C.8 Innovation Cost' equals zero and Total Number of W-2 Paid Employees or Employee/Owners from question 'A.8 Number of W-2 Paid Employees or Employee/Owners' is between 1 and 9, skip to Section D: Research and Development.

If response to 'C.8 Innovation Cost' equals zero and Total Number of W-2 Paid Employees or Employee/Owners from question 'A.8 Number of W-2 Paid Employees or Employee/Owners' is greater than or equal to 10, skip to Section E: Technology and Intellectual Property.

C.9 R&D for Activity Costs

Of the 'C.8 Innovation Costs' reported, how much was for research and development (creative and systematic work undertaken in order to increase the stock of knowledge and to devise new applications of available knowledge) in 2018 ?

$Mil. Thou. Dol.

$_____ ,000

Section D: Research and Development

The following section collects information on research and development activity from businesses.

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.

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

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. 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

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

	Yes	No
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	☐	☐

If “No” is selected for a. – j., skip to Section E: Technology and Intellectual Property.

D.2 R&D Costs

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

Total costs for 'R&D activities' reported in the R&D Activities question for 2018

$Mil. Thou. Dol.
_____ ,000

D.3 Foreign R&D Costs

During 2018, what amount, if any, of the 'D.2 R&D Costs' was performed by businesses outside the U.S.?

$Mil. Thou. Dol.
_____ ,000

D.4 Domestic R&D Costs

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:

$Mil. Thou. Dol.
_____ ,000

D.5 Types of R&D Costs

During 2018, how much of the '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	$_____,000
b.	Expensed machinery and equipment (not capitalized)	$_____,000
c.	Materials and supplies	$_____,000
d.	Payments to others for R&D, including purchased R&D services	$_____,000
e.	Depreciation on R&D property and equipment	$_____,000
f.	All other costs (for example, consultants, contractors, travel, rent)	$_____,000
	Total = Domestic R&D Costs	$_____,000

D.6 R&D Domestic Performance Costs

[Subtract item D in D.5 Types of R&D Costs (Payments to Others for R&D, including purchased R&D services) from D.4 Domestic R&D Costs. If the value is $0, or a negative number, skip to D.9 R&D Employees]

We've calculated this business's domestic R&D performance cost by subtracting the payments for R&D services (item d. in question 'D.5 - Types of R&D Costs') from domestic R&D costs (question D.4 Domestic R&D Costs'). This value will be used in the next question.

This business's domestic R&D performance cost in 2018 is:

$Mil. Thou. Dol.

$_____ ,000

D.7 Funding Sources for R&D Activities

During 2018, of the '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	$_____,000
b.	Your foreign owner (if the business is foreign owned)	$_____,000
c.	Other businesses located within the U.S.	$_____,000
d.	Other businesses located outside the U.S.	$_____,000
e.	Universities or colleges located within the U.S.	$_____,000
f.	Nonprofit organizations located within the U.S.	$_____,000
g.	U.S. Federal government (including R&D grants)	$_____,000
h.	U.S. State or Local government (not including state universities)	$_____,000
i.	All other organizations outside the U.S.	$_____,000
	Total = D.6 R&D Domestic Performance Costs	$_____,000

D.8 R&D Categories

During 2018, of the '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 acquiring new knowledge or understanding without specific immediate commercial applications or uses	$_____,000
b. **Applied Research –** activities aimed at solving a specific problem or meeting a specific commercial objective	$_____,000
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	$_____,000
Total = D.6 R&D Domestic Performance Costs	$_____,000

D.9 R&D Employees
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 'A.8 Number of W-2 Paid Employees or Employee/Owners'.

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? _____

The sum of b. and c. should equal the amount entered in a.

D.10 R&D Employee Occupations
Of the 'D.9.a. R&D Employees' 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? _____

D.11 Domestic R&D Employees Full-Time Equivalent
What was the full-time equivalent of the 'D.9.a R&D employees' R&D employees? *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 workweek they work on R&D.*

Total FTEs _____

D.12 Domestic Researchers Full-Time Equivalent
What was the full-time equivalent of the 'D.10.a R&D Employee Occupations' researchers?

Total FTEs _____

D.13 Tax Credit for Research Activities
Did this business file for the tax credit for increasing research activities (IRS Form 6765) in 2018?

☐ Yes
☐ No

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 ask 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 prespecified task(s).

E.1 Intellectual Property Activities

Indicate whether this business did any of the following during 2018. ***Select one for each row.***

		Yes	No
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	☐	☐

E.2 Importance of Intellectual Property

During 2018, how important were the following types of intellectual property protection to this business? ***Select one for each row.***

		Very Important	Somewhat Important	Not at all Important
a.	Utility patents (patents for inventions)	☐	☐	☐
b.	Design patents (patents for appearance)	☐	☐	☐
c.	Trademarks	☐	☐	☐
d.	Copyrights	☐	☐	☐
e.	Trade secrets	☐	☐	☐
f.	Nondisclosure agreements	☐	☐	☐

E.3 Production Technology for Goods and Services

During the three years 2016 to 2018, to what extent did this business use the following technologies in production processes for goods or services?

Artificial Intelligence
- ☐ Did not use
- ☐ Tested, but did not use in production or service
- ☐ Low use
- ☐ Moderate use
- ☐ High use
- ☐ Don't know

Cloud-based Computing Systems and Applications
- ☐ Did not use
- ☐ Tested, but did not use in production or service
- ☐ Low use
- ☐ Moderate use
- ☐ High use
- ☐ Don't know

Specialized Software
- ☐ Did not use
- ☐ Tested, but did not use in production or service
- ☐ Low use
- ☐ Moderate use
- ☐ High use
- ☐ Don't know

Robotics
- ☐ Did not use
- ☐ Tested, but did not use in production or service
- ☐ Low use
- ☐ Moderate use
- ☐ High use
- ☐ Don't know

Specialized Equipment
- ☐ Did not use
- ☐ Tested, but did not use in production or service
- ☐ Low use
- ☐ Moderate use
- ☐ High use
- ☐ Don't know

If all answers to E.3 are "Did not use," "Tested, but did not use in production or service," or "Don't know" then proceed to E.19 – Factors Adversely Affecting Technology Adoption and Utilization.

E.4 Motivation for Artificial Intelligence Technology Adoption and Utilization – Processes and Methods

During the three years 2016 to 2018, why did this business adopt or use Artificial Intelligence? ***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

E.5 Impact of Artificial Intelligence Technology on Workforce – Processes and Methods

During the three years 2016 to 2018, what were the effects of adopting or using Artificial Intelligence on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.6 Impact of Artificial Intelligence Technology on Worker Types – Processes and Methods

Indicate what effect Artificial Intelligence had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.7 Motivation for Cloud-Based Computing Systems and Applications Technology Adoption and Utilization – Processes and Methods

During the three years 2016 to 2018, why did this business adopt or use Cloud-based Computing Systems and Applications? ***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

E.8 Impact of Cloud-Based Computing Systems and Applications Technology on Workforce – Processes and Methods

During the three years 2016 to 2018, what were the effects of adopting or using Cloud-based Computing Systems and Applications on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.9 Impact of Cloud-Based Computing Systems and Applications Technology on Worker Types – Processes and Methods

Indicate what effect Cloud-based Computing Systems and Applications had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production worker**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.10 Motivation for Specialized Software Technology Adoption and Utilization – Processes and Methods

During the three years 2016 to 2018, why did this business adopt or use Specialized Software? ***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

E.11 Impact of Specialized Software Technology on Workforce – Processes and Methods

During the three years 2016 to 2018, what were the effects of adopting or using Specialized Software on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.12 Impact of Specialized Software Technology on Worker Types – Processes and Methods

Indicate what effect Specialized Software had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.13 Motivation for Robotics Technology Adoption and Utilization – Processes and Methods

During the three years 2016 to 2018, why did this business adopt or use Robotics? ***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

E.14 Impact of Robotics Technology on Workforce – Processes and Methods

During the three years 2016 to 2018, what were the effects of adopting or using Robotics on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.15 Impact of Robotics Technology on Worker Types – Processes and Methods

Indicate what effect Robotics had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.16 Motivation for Specialized Equipment Technology Adoption and Utilization – Processes and Methods

During the three years 2016 to 2018, why did this business adopt or use Specialized Equipment? **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

E.17 Impact of Specialized Equipment Technology on Workforce – Processes and Methods

During the three years 2016 to 2018, what were the effects of adopting or using Specialized Equipment on the following?

A. The number of workers employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.18 Impact of Specialized Equipment Technology on Worker Types – Processes and Methods

Indicate what effect Specialized Equipment had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.19 Factors Adversely Affecting Technology Adoption and Utilization

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.***

Artificial Intelligence

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Cloud-based Computing Systems and Applications

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Specialized Software

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Robotics

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Specialized Equipment

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

E.20 Technology Based Goods and Services

During the three years 2016 to 2018, did this business sell the following technologies or goods or services that included the following technologies?

Artificial Intelligence

- ☐ Yes
- ☐ No
- ☐ Don't know

Cloud-based Computing Systems and Applications

- ☐ Yes
- ☐ No
- ☐ Don't know

Specialized Software

- ☐ Yes
- ☐ No
- ☐ Don't know

Robotics

- ☐ Yes
- ☐ No
- ☐ Don't know

Specialized Equipment

- ☐ Yes
- ☐ No
- ☐ Don't know

If all answers to E.20 are "No" or "Don't know" then proceed to E.36 – Factors Adversely Affecting Technology Production.

E.21 Motivation for Artificial Intelligence Technology Adoption and Utilization – Goods and Services

During the three years 2016 to 2018, why did this business produce Artificial Intelligence, or produce goods or services that included Artificial Intelligence? ***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

E.22 Impact of Artificial Intelligence Technology on Workforce – Goods and Services

During the three years 2016 to 2018, what were the effects of producing Artificial Intelligence or producing goods or services that included Artificial Intelligence on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.23 Impact of Artificial Intelligence Technology on Worker Types – Goods and Services

Indicate what effect producing Artificial Intelligence or producing goods or services that included Artificial Intelligence had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.24 Motivation for Cloud-Based Computing Systems and Applications Technology Adoption and Utilization – Goods and Services

During the three years 2016 to 2018, why did this business produce Cloud-based Computing Systems and Applications, or produce goods or services that included Cloud-based Computing Systems and Applications? ***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

E.25 Impact of Cloud-Based Computing Systems and Applications Technology on Workforce – Goods and Services

During the three years 2016 to 2018, what were the effects of producing Cloud-based Computing Systems and Applications or producing goods or services that included Cloud-based Computing Systems and Applications on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.26 Impact of Cloud-Based Computing Systems and Applications Technology on Worker Types – Goods and Services

Indicate what effect producing Cloud-based Computing Systems and Applications or producing goods or services that included Cloud-based Computing Systems and Applications had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.27 Motivation for Specialized Software Technology Adoption and Utilization – Goods and Services

During the three years 2016 to 2018, why did this business produce Specialized Software, or produce goods or services that included Specialized Software? ***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

E.28 Impact of Specialized Software Technology on Workforce – Goods and Services

During the three years 2016 to 2018, what were the effects of producing Specialized Software or producing goods or services that included Specialized Software on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.29 Impact of Specialized Software Technology on Worker Types – Goods and Services

Indicate what effect producing Specialized Software or producing goods or services that included Specialized Software had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.30 Motivation for Robotics Technology Adoption and Utilization – Goods and Services

During the three years 2016 to 2018, why did this business produce Robotics, or produce goods or services that included Robotics? ***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

E.31 Impact of Robotics Technology on Workforce – Goods and Services

During the three years 2016 to 2018, what were the effects of producing Robotics or producing goods or services that included Robotics on the following?

A. The **number of workers** employed by this business

- ☐ Increased
- ☐ Decreased
- ☐ Did not change

B. The **skill level of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

- ☐ Increased overall
- ☐ Decreased overall
- ☐ Did not change overall
- ☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.32 Impact of Robotics Technology on Worker Types – Goods and Services

Indicate what effect producing Robotics or producing goods or services that included Robotics had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

- ☐ Increased
- ☐ Decreased
- ☐ Did not change
- ☐ Not applicable, we did not employ nonsupervisory workers

E.33 Motivation for Specialized Equipment Technology Adoption and Utilization – Goods and Services

During the three years 2016 to 2018, why did this business produce Specialized Equipment, or produce goods or services that included Specialized Equipment? ***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

E.34 Impact of Specialized Equipment Technology on Workforce – Goods and Services

During the three years 2016 to 2018, what were the effects of producing Specialized Equipment or producing goods or services that included Specialized Equipment on the following?

A. The **number of workers** employed by this business

☐ Increased
☐ Decreased
☐ Did not change

B. The **skill level of workers** employed by this business

☐ Increased overall
☐ Decreased overall
☐ Did not change overall

C. The **scientific, technological, engineering, and mathematical skills of workers** employed by this business

☐ Increased overall
☐ Decreased overall
☐ Did not change overall
☐ Not applicable, we did not employ workers with scientific, technological, engineering and mathematical skills

E.35 Impact of Specialized Equipment Technology on Worker Types – Goods and Services

Indicate what effect producing Specialized Equipment or producing goods or services that included Specialized Equipment had on the following types of workers employed by this business during the three years 2016 to 2018.

A. The number of **production workers**

☐ Increased
☐ Decreased
☐ Did not change
☐ Not applicable, we did not employ production workers

B. The number of **nonproduction workers**

☐ Increased
☐ Decreased
☐ Did not change
☐ Not applicable, we did not employ nonproduction workers

C. The number of **supervisory workers**

☐ Increased
☐ Decreased
☐ Did not change
☐ Not applicable, we did not employ supervisory workers

D. The number of **nonsupervisory workers**

☐ Increased
☐ Decreased
☐ Did not change
☐ Not applicable, we did not employ nonsupervisory workers

E.36 Factors Adversely Affecting Technology Production

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.***

Artificial Intelligence

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Cloud-based Computing Systems and Applications

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Specialized Software

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Robotics

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Specialized Equipment

- ☐ This technology was too expensive
- ☐ The technology was not mature
- ☐ Lacked access to required data
- ☐ Required data not reliable
- ☐ Lacked access to required human capital and talent
- ☐ Laws and regulations
- ☐ Concerns regarding safety and security (physical security and/or cybersecurity)
- ☐ Lacked access to capital
- ☐ Technology not applicable to this business
- ☐ No factors adversely affected the adoption of this technology

Section F: Contact Information

Contact Information

Enter the first and last name of the person who is filling out this survey. We request a telephone number so we can contact you if there is a question.

Contact Name: _____

Title: _____

Phone: _____ _____ _____ _____

Email address: _____

Remarks

Additional Remarks: Please use this space for any explanations that may be essential in understanding your reported data.

Thank You

Definitions

Products:

Products are goods and services (including knowledge-capturing products) that result from a process of production.

Goods:

Goods are physical, produced objects for which a demand exists, over which ownership rights can be established and whose ownership can be transferred from one institutional unit to another by engaging in transactions on markets.

Services:

Services are the result of a production activity that changes the conditions of the consuming units or facilitates the exchange of products or financial assets. They cannot be traded separately from their production. Services can also include some knowledge-capturing products.

Business process functions:

Business process includes the following: (1) methods for producing goods or providing services; (2) distribution and logistics; (3) marketing and sales; (4) information and communication systems; (5) administration and management activities; and (6) product and business process development (including activities to identify, develop or adapt products or a firm's processes).

Production Processes:

Production processes (or production activities) are defined as all activities, under the control of a business, that use inputs of labor, capital, goods and services to produce outputs of goods and services.

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.

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

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

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. Systems with artificial intelligence perform functions including, but not limited to, speech recognition, machine vision, or machine learning:

- 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.

Cloud-based Computing Systems and Applications:

Cloud systems and applications are computing resources available on-demand via the internet. Cloud computing enables ubiquitous, convenient, on-demand internet access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Specialized Software (excluding Artificial Intelligence):

Specialized software is custom or packaged software dedicated to performing a particular business function. Specialized software includes, but is not limited to, software applications for accounting, sales, marketing, customer service and billing, logistics, health care delivery, telemedicine, computer-aided design (CAD), computer-aided engineering (CAE), or inventory management. Specialized software excludes general purpose software such as word processing or spreadsheets. Exclude Artificial Intelligence software reported above.

Robotics:

Robotic equipment (or robots) are automatically controlled, reprogrammable, and multipurpose machines used in automated operations in industrial and service environments. Robots may be mobile, incorporated into stand-alone stations, or integrated into a production line. A robot may be part of a manufacturing cell or incorporated into another piece of equipment.

Industrial robots may perform operations such as: palletizing, pick and place, machine tending, material handling, dispensing, welding, packing/repacking, and cleanroom.

Service robots are commonly used in businesses for such operations as cleaning, delivery, construction, inspection, and medical services such as dispensing or surgery.

Specialized Equipment (excluding Robotics):

Specialized equipment refers to equipment capable of automatically carrying out pre-specified task(s). Specialized equipment includes, but is not limited to, computer numerically controlled (CNC) machinery, computer-aided manufacturing (CAM) systems, manufacturing cells, materials working lasers, automated guided vehicles systems, automated storage and retrieval systems, and automated materials handling systems. Exclude robotics equipment reported above.

Production worker:

A worker (up through the line supervisor level) engaged in activities or processes that result in the creation of products, goods or services. This includes those directly engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and guard services, product development, auxiliary production for the own use of business (e.g. a power plant), recordkeeping, and other services closely associated with these production operations in the business covered by the report. Employees above the working-supervisor level are excluded.

This group includes the following employees in the construction sector: working supervisors, qualified craft employees, mechanics, apprentices, helpers, laborers, and so forth, engaged in new work, alterations, demolition, repair, maintenance, and the like, whether working at the site of construction or in shops or yards at jobs (such as precutting and preassembling) ordinarily performed by members of the construction trades.

Nonproduction worker:

A worker engaged in the following activities: supervision above the working foreman level, sales (including driver-salesman), sales delivery (highway truck drivers and their helpers), advertising, credit collection, installation and servicing of own products, clerical and routine office functions, executive, purchasing, financing, legal, professional, and technical. Also included are employees on the payroll of the business engaged in the construction of major additions or alterations to the plant who are utilized as a separate work force.

Supervisory worker:

A worker whose major responsibility is to supervise, plan, or direct the work of others, such as top executive and managerial positions, officers of corporations, department heads, and superintendents.

Nonsupervisory worker:

A worker who does not supervise, plan, or direct the work of others. This group includes employees (not above the working-supervisor level) such as office and clerical employees, repairers, salespersons, operators, drivers, physicians, lawyers, accountants, nurses, social employees, research aides, teachers, drafters, photographers, beauticians, musicians, restaurant employees, custodial employees, attendants, line installers and repairers, laborers, janitors, guards, and other employees at similar occupational levels whose services are closely associated with those of the employees listed.