National Center for Science and Engineering Statistics

InfoBrief

First Comprehensive Innovation Survey for the United States: Data from the 2017 Annual Business Survey

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More than two-fifths (43%) of the estimated 4.6 million for-profit companies with at least one employee introduced an innovation during the period of 2015–17 (**table 1**).[1] Innovation is defined as the implementation of one or more new or significantly improved products or processes, a new marketing method, or a new organizational method. Eighteen percent of these companies introduced one or more product innovations, 16% introduced one or more process innovations, 23% introduced a marketing innovation, and 26% introduced an organizational innovation. Companies could report having more than one type of innovation.

Data from the 2017 Annual Business Survey (ABS) provide the first comprehensive view of the incidence of innovation by businesses located in the United States. These survey data represent an estimated 4.6 million for-profit companies publicly or privately held, with one or more employees, and active in the United States in 2017 (see "Survey Information and Data Availability"). The four distinct types of innovation in the ABS—product, process, marketing, and organizational—were based on guidance in the 2005 Oslo Manual, which was updated in 2018 after the inaugural Annual Business Survey was fielded.[2,3]

Table 1

Innovation incidence in companies, by industry and type of innovation: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	Any innovation (%)		Product innovation (%)		Process innovation (%)		Marketing innovation (%)		Organizational innovation (%)	
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,603,606	43.2	56.8	17.8	82.2	16.4	83.6	22.6	77.4	25.9	74.1
Manufacturing industries	31–33	220,930	57.9	42.1	28.3	71.7	34.3	65.7	30.6	69.4	32.8	67.2
Food	311	18,180	60.5	39.5	32.4	67.6	31.9	68.1	40.3	59.7	33.5	66.5
Beverage and tobacco products	312	6,724	74.5	25.5	48.0	52.0	38.2	61.8	58.9	41.1	41.9	58.1
Textile, apparel, and leather products	313–16	10,569	52.7	47.3	26.5	73.5	28.7	71.3	31.4	68.6	27.9	72.1
Wood products	321	10,850	49.4	50.6	18.6	81.4	29.4	70.6	23.5	76.5	27.7	72.3

Table 1

Innovation incidence in companies, by industry and type of innovation: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	Any innovation (%)		Product innovation (%)		Process innovation (%)		Marketing innovation (%)		Organizational innovation (%)	
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Paper	322	2,276	61.9	38.1	27.2	72.8	36.5	63.5	37.7	62.3	35.7	64.3
Printing and related support activities	323	21,903	53.0	47.0	22.5	77.5	31.5	68.5	30.0	70.0	29.3	70.7
Petroleum and coal products	324	624	57.6	42.4	26.7	73.3	30.2	69.8	33.5	66.5	34.8	65.2
Chemicals	325	7,910	67.4	32.6	41.6	58.4	38.6	61.4	40.7	59.3	38.7	61.3
Pesticide, fertilizer, and other agricultural chemical	3253	542	62.4	37.6	36.2	63.8	31.3	68.7	37.4	62.6	31.9	68.1
Pharmaceuticals and medicines	3254	1,412	69.8	30.2	41.8	58.2	46.3	53.7	45.0	55.0	44.0	56.0
Soap, cleaning compound, and toilet preparation	3256	1,615	70.6	29.4	46.1	53.9	36.7	63.3	50.7	49.3	37.4	62.6
Other chemicals	other 325	4,341	66.1	33.9	40.5	59.5	37.7	62.3	35.9	64.1	38.2	61.8
Plastics and rubber products	326	8,412	61.3	38.7	31.4	68.6	38.9	61.1	32.6	67.4	36.5	63.5
Nonmetallic mineral products	327	8,021	51.0	49.0	20.8	79.2	29.8	70.2	26.8	73.2	27.2	72.8
Primary metals	331	2,679	55.9	44.1	21.5	78.5	36.2	63.8	24.4	75.6	34.8	65.2
Fabricated metal products	332	47,340	53.6	46.4	19.7	80.3	34.8	65.2	21.9	78.1	32.5	67.5
Machinery	333	18,792	61.6	38.4	33.7	66.3	37.5	62.5	30.5	69.5	34.6	65.4
Computer and electronic products	334	9,566	71.9	28.1	47.8	52.2	38.9	61.1	35.5	64.5	38.7	61.3
Communications equipment	3342	916	77.1	22.9	55.7	44.3	37.0	63.0	38.4	61.6	38.2	61.8
Semiconductor and other electronic components	3344	3,214	66.6	33.4	36.7	63.3	42.5	57.5	29.3	70.7	43.9	56.1
Navigational, measuring, electromedical, and control instruments	3345	3,958	73.9	26.1	53.1	46.9	37.8	62.2	39.4	60.6	37.0	63.0
Other computer and electronic products	other 334	1,478	75.0	25.0	52.9	47.1	35.4	64.6	37.0	63.0	32.0	68.0
Electrical equipment, appliances, and components	335	4,223	65.1	34.9	40.6	59.4	37.6	62.4	35.5	64.5	37.9	62.1
Transportation equipment	336	8,039	62.4	37.6	35.5	64.5	36.3	63.7	33.0	67.0	35.4	64.6
Automobiles, bodies, trailers, and parts	3361–63	5,018	63.7	36.3	35.7	64.3	38.5	61.5	35.7	64.3	37.1	62.9
Aerospace products and parts	3364	1,109	65.2	34.8	31.4	68.6	38.2	61.8	19.9	80.1	41.9	58.1
Other transportation	other 336	1,912	57.6	42.4	37.1	62.9	29.3	70.7	33.4	66.6	27.3	72.7
Furniture and related products	337	12,430	52.2	47.8	22.3	77.7	31.5	68.5	23.5	76.5	29.3	70.7
Miscellaneous	339	22,315	59.8	40.2	31.6	68.4	35.5	64.5	33.8	66.2	32.1	67.9
Medical equipment and supplies	3391	8,202	57.6	42.4	29.7	70.3	35.8	64.2	28.1	71.9	29.6	70.4
Other miscellaneous manufacturing	3399	14,113	61.1	38.9	32.8	67.2	35.4	64.6	37.0	63.0	33.5	66.5
Nonmanufacturing industries	11, 21–23, 42–81	4,382,677	42.5	57.5	17.3	82.7	15.4	84.6	22.2	77.8	25.6	74.4
Agriculture, forestry, fishing, and hunting	11	21,054	31.5	68.5	8.9	91.1	13.4	86.6	10.5	89.5	18.9	81.1
Mining, extraction, and support activities	21	15,546	26.0	74.0	7.2	92.8	11.5	88.5	8.2	91.8	15.9	84.1
Utilities	22	2,534	38.0	62.0	11.3	88.7	18.0	82.0	15.8	84.2	22.2	77.8
Construction	23	607,403	34.8	65.2	10.6	89.4	12.4	87.6	14.9	85.1	22.8	77.2
Wholesale trade	42	252,134	50.3	49.7	25.2	74.8	23.4	76.6	27.6	72.4	26.7	73.3
Retail trade	44–45	545,440	44.9	55.1	21.0	79.0	14.9	85.1	27.8	72.2	23.3	76.7
Transportation and warehousing	48–49	144,404	43.0	57.0	9.7	90.3	26.8	73.2	13.8	86.2	24.3	75.7
Information	51	56,053	60.8	39.2	36.4	63.6	26.4	73.6	38.6	61.4	33.8	66.2
Publishing	511	17,031	66.0	34.0	41.5	58.5	28.9	71.1	43.6	56.4	36.6	63.4
Newspaper, periodical, book, and directory publishers	5111	9,593	56.3	43.7	27.7	72.3	22.9	77.1	39.0	61.0	28.6	71.4

Table 1

Innovation incidence in companies, by industry and type of innovation: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	Any innovation (%)		Product innovation (%)		Process innovation (%)		Marketing innovation (%)		Organizational innovation (%)	
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Software publishers	5112	7,438	78.6	21.4	59.3	40.7	36.6	63.4	49.4	50.6	46.8	53.2
Telecommunications	517	6,045	58.7	41.3	33.2	66.8	28.0	72.0	33.4	66.6	33.3	66.7
Data processing, hosting, and related services	518	8,414	69.7	30.3	47.5	52.5	36.3	63.7	39.0	61.0	41.9	58.1
Other information	other 51	24,563	54.6	45.4	29.8	70.2	20.9	79.1	36.2	63.8	29.3	70.7
Finance and insurance	52	192,345	46.1	53.9	19.8	80.2	16.2	83.8	21.3	78.7	30.1	69.9
Real estate and rental and leasing	53	229,923	36.0	64.0	10.5	89.5	11.5	88.5	19.4	80.6	23.7	76.3
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,701	52.4	47.6	20.9	79.1	15.6	84.4	36.8	63.2	34.3	65.7
Other real estate and rental and leasing	other 53	228,222	35.9	64.1	10.4	89.6	11.5	88.5	19.3	80.7	23.6	76.4
Professional, scientific, and technical services	54	639,985	46.0	54.0	21.5	78.5	19.9	80.1	22.3	77.7	28.2	71.8
Legal services	5411	146,441	33.1	66.9	9.6	90.4	11.1	88.9	16.3	83.7	21.8	78.2
Accounting, tax preparation, bookkeeping, and payroll services	5412	99,782	36.5	63.5	11.2	88.8	19.6	80.4	12.8	87.2	22.0	78.0
Architectural, engineering, and related services	5413	83,492	47.3	52.7	22.9	77.1	19.7	80.3	23.0	77.0	29.9	70.1
Specialized design services	5414	25,140	55.8	44.2	25.2	74.8	18.9	81.1	40.4	59.6	28.9	71.1
Computer systems design and related services	5415	90,056	60.2	39.8	36.2	63.8	34.9	65.1	26.6	73.4	35.2	64.8
Management, scientific, and technical consulting services	5416	109,247	51.6	48.4	28.4	71.6	21.4	78.6	23.5	76.5	32.7	67.3
Scientific research and development services	5417	9,293	61.6	38.4	35.8	64.2	25.0	75.0	28.4	71.6	38.0	62.0
Advertising, public relations, and related services	5418	25,626	55.9	44.1	25.4	74.6	19.3	80.7	39.3	60.7	32.2	67.8
Other professional, scientific, and technical services	5419	50,907	50.2	49.8	26.7	73.3	15.8	84.2	28.5	71.5	29.6	70.4
Management of companies and enterprises	55	2,276	31.2	68.8	10.1	89.9	9.0	91.0	17.2	82.8	23.5	76.5
Administrative and support and waste management and remediation services	56	266,751	41.8	58.2	15.7	84.3	16.1	83.9	20.3	79.7	26.5	73.5
Educational services	61	51,288	58.1	41.9	33.1	66.9	18.1	81.9	34.7	65.3	34.1	65.9
Health care and social assistance	62	509,529	43.0	57.0	18.4	81.6	12.8	87.2	19.5	80.5	28.4	71.6
Health care services	621–23	447,069	42.9	57.1	18.4	81.6	13.1	86.9	19.6	80.4	28.0	72.0
Social assistance	624	62,461	44.0	56.0	18.4	81.6	11.4	88.6	18.9	81.1	31.3	68.7
Arts, entertainment, and recreation	71	74,256	45.5	54.5	22.5	77.5	12.2	87.8	29.1	70.9	25.5	74.5
Accommodation and food services	72	441,426	41.1	58.9	13.3	86.7	11.3	88.7	27.3	72.7	24.6	75.4
Other services	81	330,331	38.9	61.1	15.4	84.6	12.4	87.6	21.6	78.4	22.1	77.9

NAICS = 2017 North American Industry Classification System.

Note(s):
Detail may not add to total because of rounding. Industry classification based on dominant establishment payroll. Statistics are representative of companies located in the United States. Companies may have multiple types of innovation.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Distinctions must be made when discussing innovation incidence by industry, because substantial differences exist between manufacturing and nonmanufacturing industries as well as between R&D-active companies and non-R&D-active companies. Although rates of innovation generally are higher for manufacturing and R&D-active companies than for nonmanufacturing and non-R&D-active companies, the absolute number of companies reporting innovation is larger in nonmanufacturing industries and in companies that are not R&D funders or performers. Of the 4.6 million companies represented in the ABS, 221,000 (5%) were in manufacturing and 4.4 million companies (95%) were in nonmanufacturing (table 1).

Incidence of Innovation across the U.S. Economy

The innovation incidence rate was 43% during 2015–17 for all companies that introduced one or more of the following innovations (table 1):

- Product innovations are the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. Product innovation can utilize new knowledge or technologies or can be based on new uses or combinations of existing knowledge or technologies.
- Process innovations are the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment, or software. Process innovations can be intended to decrease unit costs of production or delivery, increase quality, or produce or deliver new or significantly improved products.
- Marketing innovations are the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing.
- Organizational innovations are the implementation of a new organizational method in the firm's business practices, workplace organization, or external relations.

In 2015–17, the incidence rate was 18% for product innovation among businesses located in the United States. For process innovation, it was 16%; for marketing, 23%; and for organizational innovation, 26% (table 1).

Manufacturing Industries

In 2015–17, 58% of the companies classified in manufacturing industries (North American Industry Classification System codes [NAICS] 31–33) reported any kind of innovation, compared with 43% of companies classified in nonmanufacturing industries (NAICS 11, 21–23, 42–81). More than one-quarter (28%) of manufacturing companies reported product innovations, compared with 17% of nonmanufacturing companies. For process innovations, the innovation rate for manufacturing industries was more twice that of nonmanufacturing industries (34% versus 15%).

Higher incidence rates of innovation were also evident in several more narrowly defined manufacturing subsectors. Product innovations were reported by about one-half each of companies in the communications equipment industry (NAICS 3342), navigational, measuring, electromedical, and control instruments industry (NAICS 3345), and other computer and electronic products industry (NAICS other 334) (56%, 53%, and 53%, respectively).

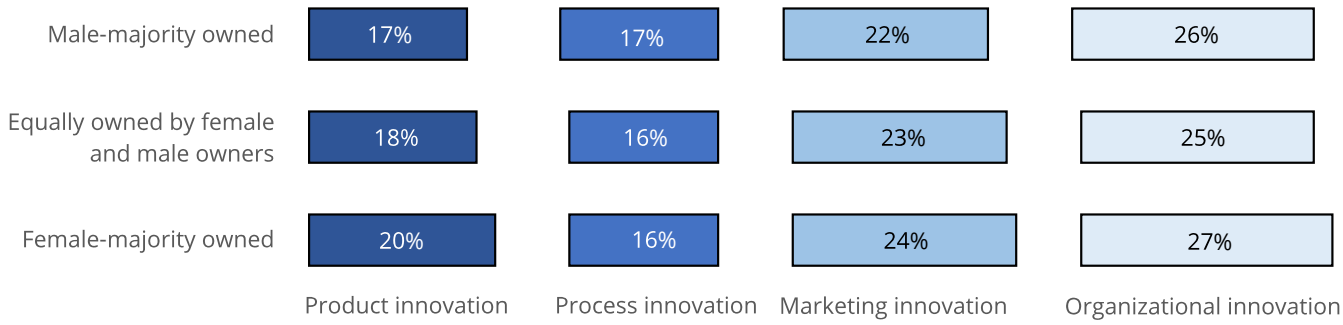
Several manufacturing subsectors exhibited product innovation rates well below the overall incidence rate for manufacturing as a whole. Notable in this respect are the companies in the following industries: wood products (NAICS 321), printing and related support (NAICS 323), nonmetallic mineral products (NAICS 327), and primary metals (NAICS 331), each of which reported product innovation rates of 23% or less.

By Sex and by Race and Ethnicity

A slightly higher proportion of companies where females were the majority owner or owners (female-majority owned companies) (20%) were product innovators, compared with 17% of male-majority owned companies (figure 1). By contrast, for process innovations, the proportions were nearly identical for female- and male-majority owned companies (16% and 17%).

Figure 1

Innovation incidence rate in companies, by type of innovation and sex of majority owner or owners: 2017

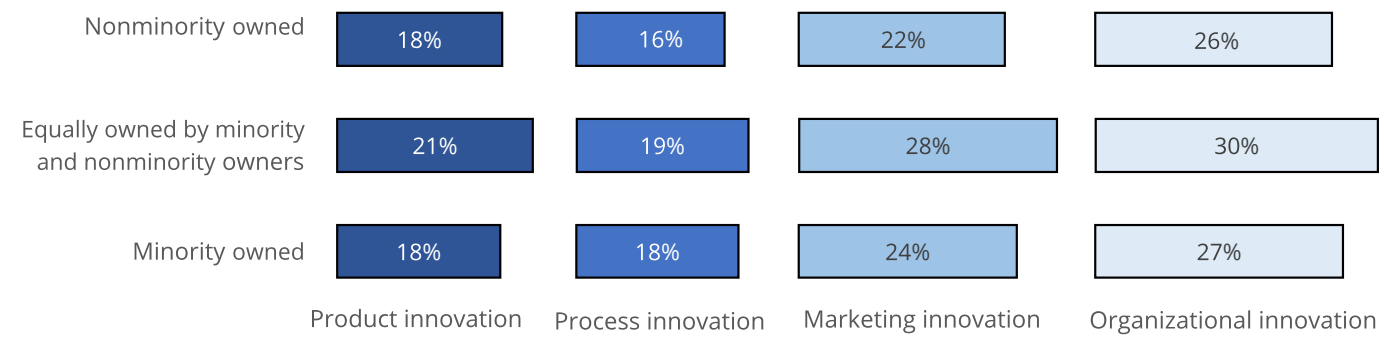


Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

There were no significant differences between companies regarding innovation incidence across three out of four different types of innovation regardless of whether minorities or nonminorities were the majority owner or owners (minority- or nonminority-owned companies) (figure 2). However, there was a significant difference for marketing innovations. One-quarter (24%) of minority-owned companies were marketing innovators, compared with 22% of nonminority-owned companies. Eighteen percent each of minority- and nonminority-owned companies were product innovators, while 21% of companies owned equally by minority and nonminority owners were product innovators.

Figure 2

Innovation incidence rate in companies, by type of innovation and race of majority owner or owners: 2017



Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

By State

There were for the most part only small differences in the product innovation rates among companies located in the 50 states and the District of Columbia. Nine states and the District of Columbia each had a product innovation incidence rate measured 20% or higher during 2015–17 (table 2).[4] The District of Columbia and 8 of these same 9 states also had the highest incidence of process innovation. Eighteen states and the District of Columbia had a measured process innovation incidence rate of 17% or higher during the 2015–17 period.

Table 2

Incidence of product and process innovation in companies, by state: 2015–17

(Number and percent)

State	Companies (number)	Product innovation (%)		Process innovation (%)	
		Yes	No	Yes	No
All states	4,603,606	17.8	82.2	16.4	83.6
Alabama	54,950	15.8	84.2	13.7	86.3
Alaska	10,992	19.5	80.5	16.6	83.4
Arizona	75,073	19.1	80.9	16.7	83.3
Arkansas	38,658	16.2	83.8	14.4	85.6
California	559,272	19.0	81.0	17.6	82.4
Colorado	107,150	20.5	79.5	16.9	83.1
Connecticut	53,295	16.9	83.1	15.1	84.9
Delaware	13,253	19.6	80.4	16.9	83.1
District of Columbia	7,820	21.6	78.4	19.2	80.8
Florida	318,803	18.6	81.4	17.5	82.5
Georgia	127,852	17.9	82.1	16.5	83.5
Hawaii	18,733	19.7	80.3	17.4	82.6
Idaho	32,349	17.4	82.6	14.8	85.2
Illinois	194,840	17.9	82.1	16.6	83.4
Indiana	86,402	17.9	82.1	16.1	83.9
Iowa	53,881	16.7	83.3	14.9	85.1
Kansas	45,217	17.0	83.0	15.1	84.9
Kentucky	51,025	15.0	85.0	13.6	86.4
Louisiana	58,403	14.8	85.2	14.5	85.5
Maine	24,741	18.0	82.0	15.0	85.0
Maryland	81,899	17.3	82.7	16.7	83.3
Massachusetts	97,479	17.2	82.8	15.5	84.5
Michigan	139,849	18.2	81.8	16.9	83.1
Minnesota	94,976	17.6	82.4	16.2	83.8
Mississippi	30,902	15.1	84.9	13.6	86.4
Missouri	85,847	16.8	83.2	15.0	85.0
Montana	26,074	20.5	79.5	17.4	82.6
Nebraska	35,499	16.4	83.6	15.1	84.9
Nevada	36,351	20.1	79.9	15.9	84.1
New Hampshire	23,189	19.9	80.1	17.7	82.3
New Jersey	141,527	16.8	83.2	15.6	84.4
New Mexico	24,626	19.8	80.2	17.4	82.6
New York	307,809	16.1	83.9	15.4	84.6
North Carolina	137,392	18.3	81.7	16.1	83.9
North Dakota	15,723	16.5	83.5	14.9	85.1
Ohio	146,952	17.0	83.0	16.0	84.0
Oklahoma	54,711	15.7	84.3	14.6	85.4
Oregon	76,053	19.1	80.9	16.9	83.1
Pennsylvania	177,870	17.2	82.8	15.9	84.1
Rhode Island	15,356	17.5	82.5	16.5	83.5
South Carolina	59,641	16.7	83.3	15.5	84.5
South Dakota	17,491	16.4	83.6	12.2	87.8
Tennessee	71,487	17.8	82.2	14.8	85.2
Texas	306,151	18.0	82.0	17.4	82.6
Utah	50,794	19.5	80.5	17.5	82.5
Vermont	13,648	17.3	82.7	15.6	84.4
Virginia	117,100	18.4	81.6	16.4	83.6
Washington	119,366	18.5	81.5	16.2	83.8

Table 2

Incidence of product and process innovation in companies, by state: 2015–17

(Number and percent)

State	Companies (number)	Product innovation (%)		Process innovation (%)	
		Yes	No	Yes	No
West Virginia	19,472	12.9	87.1	11.8	88.2
Wisconsin	93,593	16.9	83.1	15.5	84.5
Wyoming	12,685	18.4	81.6	14.8	85.2
Undistributed	39,385	24.8	75.2	26.1	73.9

Note(s):
Detail may not add to total because of rounding. Statistics are representative of companies located in the United States.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Product Innovation and R&D Activity

Innovative companies exhibit high rates of R&D activity (in-house or external R&D).[5] One-third (33%) of innovative companies had R&D activity (table 3). For innovative manufacturing companies 65% had R&D activity, while 31% of innovative nonmanufacturing companies had R&D activity.

Table 3

Product innovating companies, by industry and R&D activity: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	In-house or external R&D			
			Number		Percent	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	821,671	272,342	549,329	33.1	66.9
Manufacturing industries	31–33	62,446	40,568	21,878	65.0	35.0
Food	311	5,891	3,303	2,588	56.1	43.9
Beverage and tobacco products	312	3,228	2,046	1,182	63.4	36.6
Textile, apparel, and leather products	313–16	2,800	1,477	1,323	52.8	47.2
Wood products	321	2,016	908	1,108	45.1	54.9
Paper	322	618	369	249	59.7	40.3
Printing and related support activities	323	4,932	1,933	2,999	39.2	60.8
Petroleum and coal products	324	167	137	29	82.5	17.5
Chemicals	325	3,290	2,756	533	83.8	16.2
Pesticide, fertilizer, and other agricultural chemical	3253	196	116	80	59.2	40.8
Pharmaceuticals and medicines	3254	591	533	57	90.3	9.7
Soap, cleaning compound, and toilet preparation	3256	744	589	155	79.1	20.9
Other chemicals	other 325	1,759	1,518	241	86.3	13.7
Plastics and rubber products	326	2,639	1,935	704	73.3	26.7
Nonmetallic mineral products	327	1,666	879	787	52.7	47.3
Primary metals	331	577	401	175	69.6	30.4
Fabricated metal products	332	9,316	6,039	3,277	64.8	35.2
Machinery	333	6,330	5,170	1,160	81.7	18.3
Computer and electronic products	334	4,571	4,057	514	88.8	11.2
Communications equipment	3342	510	437	72	85.8	14.2
Semiconductor and other electronic components	3344	1,178	1,022	156	86.7	13.3

Table 3

Product innovating companies, by industry and R&D activity: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	In-house or external R&D			
			Number		Percent	
			Yes	No	Yes	No
Navigational, measuring, electromedical, and control instruments	3345	2,101	1,955	146	93.0	7.0
Other computer and electronic products	other 334	782	643	139	82.3	17.7
Electrical equipment, appliances, and components	335	1,714	1,380	334	80.5	19.5
Transportation equipment	336	2,851	2,169	682	76.1	23.9
Automobiles, bodies, trailers, and parts	3361–63	1,793	1,334	459	74.4	25.6
Aerospace products and parts	3364	348	260	88	74.8	25.2
Other transportation	other 336	710	574	136	80.9	19.1
Furniture and related products	337	2,767	1,264	1,502	45.7	54.3
Miscellaneous	339	7,060	4,329	2,731	61.3	38.7
Medical equipment and supplies	3391	2,432	1,337	1,096	55.0	45.0
Other miscellaneous manufacturing	3399	4,627	2,992	1,635	64.7	35.3
Nonmanufacturing industries	11, 21–23, 42–81	759,225	231,774	527,451	30.5	69.5
Agriculture, forestry, fishing, and hunting	11	1,883	558	1,325	29.6	70.4
Mining, extraction, and support activities	21	1,119	468	651	41.8	58.2
Utilities	22	287	109	178	37.9	62.1
Construction	23	64,453	14,917	49,535	23.1	76.9
Wholesale trade	42	63,426	25,659	37,767	40.5	59.5
Retail trade	44–45	114,735	24,875	89,860	21.7	78.3
Transportation and warehousing	48–49	13,973	3,665	10,308	26.2	73.8
Information	51	20,395	12,302	8,093	60.3	39.7
Publishing	511	7,062	4,948	2,115	70.1	29.9
Newspaper, periodical, book, and directory publishers	5111	2,653	956	1,696	36.1	63.9
Software publishers	5112	4,410	3,991	419	90.5	9.5
Telecommunications	517	2,007	869	1,138	43.3	56.7
Data processing, hosting, and related services	518	3,997	2,912	1,085	72.8	27.2
Other information	other 51	7,328	3,573	3,755	48.8	51.2
Finance and insurance	52	38,092	9,372	28,720	24.6	75.4
Real estate and rental and leasing	53	24,163	6,411	17,752	26.5	73.5
Lessors of nonfinancial intangible assets (except copyrighted works)	533	355	207	147	58.5	41.5
Other real estate and rental and leasing	other 53	23,808	6,204	17,604	26.1	73.9
Professional, scientific, and technical services	54	137,653	64,666	72,987	47.0	53.0
Legal services	5411	14,014	3,463	10,551	24.7	75.3
Accounting, tax preparation, bookkeeping, and payroll services	5412	11,155	2,431	8,724	21.8	78.2
Architectural, engineering, and related services	5413	19,119	11,392	7,727	59.6	40.4
Specialized design services	5414	6,347	2,754	3,593	43.4	56.6
Computer systems design and related services	5415	32,559	22,457	10,102	69.0	31.0
Management, scientific, and technical consulting services	5416	31,006	13,282	17,725	42.8	57.2
Scientific research and development services	5417	3,323	2,971	351	89.4	10.6
Advertising, public relations, and related services	5418	6,518	2,326	4,192	35.7	64.3
Other professional, scientific, and technical services	5419	13,610	3,588	10,022	26.4	73.6
Management of companies and enterprises	55	229	115	115	50.0	50.0
Administrative and support and waste management and remediation services	56	41,914	11,085	30,829	26.4	73.6
Educational services	61	16,968	6,063	10,905	35.7	64.3
Health care and social assistance	62	93,660	21,150	72,510	22.6	77.4
Health care services	621–23	82,181	18,671	63,510	22.7	77.3

Table 3

Product innovating companies, by industry and R&D activity: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	In-house or external R&D			
			Number		Percent	
			Yes	No	Yes	No
Social assistance	624	11,479	2,479	9,000	21.6	78.4
Arts, entertainment, and recreation	71	16,684	4,646	12,037	27.8	72.2
Accommodation and food services	72	58,621	14,844	43,777	25.3	74.7
Other services	81	50,971	10,870	40,102	21.3	78.7

NAICS = 2017 North American Industry Classification System.

Note(s):
Detail may not add to total because of rounding. Industry classification based on dominant establishment payroll. R&D activity is based on unedited company responses to innovation questions, not R&D expenditures. Statistics are representative of companies located in the United States.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Larger innovative businesses have high rates of R&D activity. For the smallest innovative companies, those with 1 to 4 employees, 30% have R&D activity, compared with more than three-quarters of innovative businesses with 5,000 or more employees (table 4).

Table 4

Product innovating companies, by size of company and R&D activity: 2015–17

(Number and percent)

Employment size	Companies (number)	In-house or external R&D			
		Number		Percent	
		Yes	No	Yes	No
All companies	821,671	272,342	549,329	33.1	66.9
Micro companies					
1–4	436,753	132,026	304,727	30.2	69.8
5–9	166,226	51,000	115,226	30.7	69.3
Small companies					
10–19	109,894	37,957	71,938	34.5	65.5
20–49	68,668	29,002	39,666	42.2	57.8
Medium companies					
50–99	21,417	10,920	10,497	51.0	49.0
100–249	11,447	6,544	4,903	57.2	42.8
Large companies					
250–499	3,660	2,337	1,323	63.9	36.1
500–999	1,599	1,055	544	66.0	34.0
1,000–4,999	1,464	1,074	390	73.4	26.6
5,000–9,999	273	216	58	78.9	21.1
10,000–24,999	163	128	34	78.9	21.1
25,000 or more	107	84	23	78.4	21.6

Note(s):
Detail may not add to total because of rounding. R&D activity is based on unedited company responses to innovation questions, not R&D expenditures. Statistics are representative of companies located in the United States.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Novelty of Product Innovation

As defined in the Oslo Manual, innovation must contain a degree of novelty. Products that are new to the market are assumed to have a higher degree of novelty than are products that are new only to the business. Nine percent of all companies in the ABS introduced a new or significantly improved product during 2015–17 that was new to the market, whereas 17% of companies introduced product innovations that were new only to the firm (table 5). In the manufacturing sector, 18% said they introduced products new to the market and 24% introduced product innovations as new only to the firm. In the nonmanufacturing sector, these rates were 9% and 16%.

Table 5

Companies with new to the business and new to the market product innovation, by industry: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation new to the business (%)		Product innovation new to market (%)	
			Yes	No	Yes	No
All industries	11, 21–23, 31–33, 42–81	4,603,606	16.6	83.4	8.9	91.1
Manufacturing industries	31–33	220,930	23.6	76.4	17.6	82.4
Food	311	18,180	27.9	72.1	21.4	78.6
Beverage and tobacco products	312	6,724	43.2	56.8	26.1	73.9
Textile, apparel, and leather products	313–16	10,569	22.1	77.9	16.5	83.5
Wood products	321	10,850	16.0	84.0	10.1	89.9
Paper	322	2,276	21.2	78.8	16.4	83.6
Printing and related support activities	323	21,903	21.3	78.7	9.3	90.7
Petroleum and coal products	324	624	22.5	77.5	17.1	82.9
Chemicals	325	7,910	32.3	67.7	27.8	72.2
Pesticide, fertilizer, and other agricultural chemical	3253	542	27.4	72.6	21.8	78.2
Pharmaceuticals and medicines	3254	1,412	32.4	67.6	33.5	66.5
Soap, cleaning compound, and toilet preparation	3256	1,615	37.0	63.0	26.5	73.5
Other chemicals	other 325	4,341	31.2	68.8	27.2	72.8
Plastics and rubber products	326	8,412	25.5	74.5	19.8	80.2
Nonmetallic mineral products	327	8,021	17.9	82.1	13.9	86.1
Primary metals	331	2,679	18.1	81.9	12.8	87.2
Fabricated metal products	332	47,340	17.7	82.3	10.9	89.1
Machinery	333	18,792	24.8	75.2	25.2	74.8
Computer and electronic products	334	9,566	35.1	64.9	36.1	63.9
Communications equipment	3342	916	42.9	57.1	40.4	59.6
Semiconductor and other electronic components	3344	3,214	29.7	70.3	27.5	72.5
Navigational, measuring, electromedical, and control instruments	3345	3,958	35.5	64.5	41.4	58.6
Other computer and electronic products	other 334	1,478	41.0	59.0	37.6	62.4
Electrical equipment, appliances, and components	335	4,223	30.2	69.8	28.4	71.6
Transportation equipment	336	8,039	26.3	73.7	26.4	73.6
Automobiles, bodies, trailers, and parts	3361–63	5,018	27.8	72.2	25.9	74.1
Aerospace products and parts	3364	1,109	19.1	80.9	23.2	76.8
Other transportation	other 336	1,912	26.5	73.5	29.5	70.5
Furniture and related products	337	12,430	19.6	80.4	11.3	88.7
Miscellaneous	339	22,315	27.2	72.8	20.4	79.6
Medical equipment and supplies	3391	8,202	27.9	72.1	16.3	83.7
Other miscellaneous manufacturing	3399	14,113	26.7	73.3	22.8	77.2
Nonmanufacturing industries	11, 21–23, 42–81	4,382,677	16.2	83.8	8.5	91.5
Agriculture, forestry, fishing, and hunting	11	21,054	8.5	91.5	3.8	96.2

Table 5

Companies with new to the business and new to the market product innovation, by industry: 2015–17

(Number and percent)

Industry	NAICS code	Companies (number)	Product innovation new to the business (%)		Product innovation new to market (%)	
			Yes	No	Yes	No
Mining, extraction, and support activities	21	15,546	7.4	92.6	3.6	96.4
Utilities	22	2,534	10.7	89.3	4.9	95.1
Construction	23	607,403	10.9	89.1	4.4	95.6
Wholesale trade	42	252,134	22.0	78.0	16.8	83.2
Retail trade	44–45	545,440	19.5	80.5	12.3	87.7
Transportation and warehousing	48–49	144,404	10.0	90.0	3.6	96.4
Information	51	56,053	29.0	71.0	21.2	78.8
Publishing	511	17,031	29.9	70.1	27.7	72.3
Newspaper, periodical, book, and directory publishers	5111	9,593	20.7	79.3	17.4	82.6
Software publishers	5112	7,438	41.8	58.2	40.8	59.2
Telecommunications	517	6,045	27.7	72.3	19.2	80.8
Data processing, hosting, and related services	518	8,414	37.4	62.6	28.1	71.9
Other information	other 51	24,563	25.9	74.1	14.9	85.1
Finance and insurance	52	192,345	18.0	82.0	8.0	92.0
Real estate and rental and leasing	53	229,923	10.0	90.0	4.0	96.0
Lessors of nonfinancial intangible assets (except copyrighted works)	533	1,701	16.9	83.1	9.4	90.6
Other real estate and rental and leasing	other 53	228,222	10.0	90.0	3.9	96.1
Professional, scientific, and technical services	54	639,985	19.1	80.9	9.4	90.6
Legal services	5411	146,441	9.4	90.6	2.5	97.5
Accounting, tax preparation, bookkeeping, and payroll services	5412	99,782	10.9	89.1	3.2	96.8
Architectural, engineering, and related services	5413	83,492	20.2	79.8	11.0	89.0
Specialized design services	5414	25,140	22.8	77.2	11.2	88.8
Computer systems design and related services	5415	90,056	30.9	69.1	17.6	82.4
Management, scientific, and technical consulting services	5416	109,247	24.4	75.6	13.5	86.5
Scientific research and development services	5417	9,293	23.0	77.0	27.9	72.1
Advertising, public relations, and related services	5418	25,626	23.1	76.9	10.5	89.5
Other professional, scientific, and technical services	5419	50,907	24.7	75.3	10.9	89.1
Management of companies and enterprises	55	2,276	8.8	91.2	4.2	95.8
Administrative and support and waste management and remediation services	56	266,751	15.2	84.8	6.1	93.9
Educational services	61	51,288	27.3	72.7	17.1	82.9
Health care and social assistance	62	509,529	17.6	82.4	7.2	92.8
Health care services	621–23	447,069	17.7	82.3	7.3	92.7
Social assistance	624	62,461	17.3	82.7	6.8	93.2
Arts, entertainment, and recreation	71	74,256	18.9	81.1	12.0	88.0
Accommodation and food services	72	441,426	13.6	86.4	8.2	91.8
Other services	81	330,331	15.0	85.0	7.6	92.4

NAICS = 2017 North American Industry Classification System.

Note(s):
Detail may not add to total because of rounding. Industry classification based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Factors Interfering with Innovation

There are a number of factors—such as financing, availability of skilled employees, or market conditions—that can interfere with a company's ability to innovate. About 58% each of innovating companies reported that lack of internal financing or lack of skilled employees within the business were very important barriers to innovation during 2015–17 (table 6). For innovating companies, the smaller the company, the more likely it was to report that a lack of internal financing was an important factor that could interfere with innovation. For innovating companies with 250 or more employees, 43% reported a lack of internal financing as a very important factor in their ability to innovate. By comparison, 59% of innovating microbusinesses, those with fewer than 10 employees, reported a lack of internal financing as a very important factor in their ability to innovate. The lack of skilled employees as a barrier to innovation was one of the most important factors, regardless of the size of the company.

Table 6

Factors interfering with innovation among innovating companies, by company size: 2015–17

(Percent)

Factors interfering with innovation	All companies	Micro companies (1–9 employees)	Small companies (10–49 employees)	Medium companies (50–249 employees)	Large companies (≥250 employees)
All companies (count of companies)	1,989,523	1,418,216	464,339	88,947	18,021
Lack of internal financing	57.5	58.6	56.5	48.1	43.0
Lack of credit or private equity	42.3	43.6	40.9	32.5	27.4
Innovation costs too high	52.4	52.2	53.8	50.3	51.7
Lack of skilled employees within the business	58.2	55.8	64.6	62.9	56.4
Lack of collaboration partners	33.8	34.0	33.7	31.4	31.7
Difficulties in obtaining government grants or subsidies	23.0	23.7	22.1	17.6	15.4
Uncertain market demand for your ideas	40.7	41.0	40.2	39.5	41.9
Too much competition in your market	53.0	53.1	53.0	52.1	51.6

Note(s):
Detail may not add to total because of rounding. Statistics are representative of companies located in the United States. Innovating companies are defined here as those with product, process, marketing, or organizational innovation. Percent shares include companies indicating the factor is very important as well as companies indicating the factor is somewhat important.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Companies that considered innovating but thought there were too many issues preventing them from doing so were also asked about the barriers to innovation. Not surprisingly, 83% reported innovation costs being too high and 80% reported the lack of internal financing as being very important factors preventing innovation (table 7).

Table 7

Factors preventing innovation among non-innovating companies, by company size: 2015–17

(Percent)

Factors preventing innovation	All companies	Micro companies (1–9 employees)	Small companies (10–49 employees)	Medium companies (50–249 employees)	Large companies (≥250 employees)
Non-innovating companies that considered innovating (count of companies)	43,615	32,826	8,833	1,663	293
Lack of internal financing	80.4	82.2	75.6	71.5	66.8
Lack of credit or private equity	60.6	62.9	55.2	49.1	41.2
Innovation costs too high	82.7	83.8	79.9	75.4	83.5
Lack of skilled employees within the business	75.1	74.5	77.3	75.9	74.6
Lack of collaboration partners	56.5	56.4	57.1	54.6	58.1
Difficulties in obtaining government grants or subsidies	39.8	41.4	36.6	29.0	22.3
Uncertain market demand for your ideas	63.6	63.9	62.8	64.1	60.7
Too much competition in your market	68.9	69.1	67.7	72.1	63.8
Legislation or regulation that generated excessive burden	51.8	52.0	52.3	45.9	52.2
Legislation or regulation that created uncertainty	52.4	52.6	52.3	49.8	51.7
Legislation or regulation that lacked consistency across the United States	46.1	46.4	45.9	41.8	41.3

Note(s):
Detail may not add to total because of rounding. Statistics are representative of companies located in the United States. Innovating companies are defined here as those with product, process, marketing, or organizational innovation. Percent shares include companies indicating the factor is very important as well as companies indicating the factor is somewhat important.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Innovation Cooperation and Partnerships

The ABS also asked about innovation cooperation, defined as active participation with other companies or organizations on innovation activities, although both partners do not need to commercially benefit. A greater percentage of larger companies had innovation partners. About one-half (53%) of companies with 250 or more employees reported at least one innovation partner, compared with 41% of companies with fewer than 10 employees (table 8). A greater percentage of partners were in the United States than in other countries regardless of company size. A greater percentage of partners were customers or suppliers, rather than universities, governments, or private research institutes.

Table 8

Innovating companies, by type and location of cooperation partner and size of company: 2015–17

(Percent)

Type and location of cooperation partner	All companies	Companies with 1–9 employees	Companies with 10–49 employees	Companies with 50–249 employees	Companies with ≥250 employees
All companies with innovation activities (count of companies)	1,989,523	1,418,216	464,339	88,947	18,021
Type of cooperation partner, global					

Table 8

Innovating companies, by type and location of cooperation partner and size of company: 2015–17

(Percent)

Type and location of cooperation partner	All companies	Companies with 1–9 employees	Companies with 10–49 employees	Companies with 50–249 employees	Companies with ≥250 employees
Any cooperation partner	41.6	41.0	41.9	47.4	53.4
Other affiliated companies	13.9	13.2	14.6	18.9	28.8
Suppliers of equipment, materials, components, or software	29.1	27.9	31.2	35.2	38.2
Clients or customers from the private sector	27.7	27.8	26.9	29.7	31.6
Clients or customers from the public sector	20.3	20.3	20.6	20.3	19.8
Competitors or other companies in your sector	17.8	18.0	17.5	17.2	16.2
Companies not in your sector	10.2	10.0	10.5	11.1	12.3
Consultants or commercial labs	12.4	11.6	13.6	17.8	24.0
Universities or other higher education institutes	8.1	7.8	8.7	9.6	12.7
Government or public research institutes	5.2	5.1	5.5	5.6	7.2
Private research institutes	4.7	4.5	4.9	4.9	7.0
Type of cooperation partner, located in United States					
Any cooperation partner	40.9	40.2	41.3	46.7	51.8
Other affiliated companies	13.2	12.6	13.8	17.4	25.8
Suppliers of equipment, materials, components, or software	28.0	26.8	30.2	34.2	36.9
Clients or customers from the private sector	27.2	27.2	26.5	29.4	31.0
Clients or customers from the public sector	19.9	19.8	20.2	20.1	19.3
Competitors or other companies in your sector	17.3	17.4	17.1	16.8	15.4
Companies not in your sector	9.7	9.5	10.2	10.8	11.8
Consultants or commercial labs	12.0	11.1	13.2	17.5	23.5
Universities or other higher education institutes	7.8	7.4	8.4	9.4	12.2
Government or public research institutes	4.8	4.7	5.2	5.4	6.8
Private research institutes	4.3	4.1	4.6	4.7	6.6
Type of cooperation partner, located outside United States					
Any cooperation partner	4.5	4.3	4.2	6.5	14.7
Other affiliated companies	1.2	1.0	1.2	2.6	9.5
Suppliers of equipment, materials, components, or software	2.4	2.3	2.5	3.7	8.3
Clients or customers from the private sector	1.6	1.5	1.4	2.2	5.2
Clients or customers from the public sector	0.9	0.8	0.8	1.0	3.0
Competitors or other companies in your sector	1.0	1.0	0.9	1.1	2.8
Companies not in your sector	0.7	0.7	0.6	0.7	2.1
Consultants or commercial labs	0.8	0.8	0.7	1.1	3.4
Universities or other higher education institutes	0.6	0.6	0.5	0.4	2.0

Table 8

Innovating companies, by type and location of cooperation partner and size of company: 2015–17

(Percent)

Type and location of cooperation partner	All companies	Companies with 1–9 employees	Companies with 10–49 employees	Companies with 50–249 employees	Companies with ≥250 employees
Government or public research institutes	0.4	0.5	0.4	0.3	1.1
Private research institutes	0.5	0.5	0.4	0.4	1.5

Note(s):
Detail may not add to total because of rounding. Innovating companies are defined here as those with product, process, marketing, or organizational innovation. Statistics are representative of companies located in the United States.

Source(s):
National Center for Science and Engineering Statistics and Census Bureau, Annual Business Survey, 2017.

Survey Information and Data Availability

The ABS is designed to collect a wide range of data on business R&D, intellectual property, company and primary owner characteristics, and innovation activities in the United States. The ABS was developed and is cosponsored by the National Center for Science and Engineering Statistics within the National Science Foundation and by the Census Bureau. The statistics from the survey are based on a sample, and as such, they are subject to both sampling and nonsampling errors (see technical notes in the data tables report *Annual Business Survey: 2017* that are available at https://ncses.nsf.gov/pubs/nsf21303).

For the 2017 ABS, 849,970 employer companies were sampled to represent the population of 5.3 million employer companies, 4.6 million of which were in scope for the innovation and technology modules. For the 2017 ABS, the unit response rate was 68%.

The full set of data tables on innovation, R&D, company demographics, technology, and patent and intellectual property protection from this survey are available in the report Annual Business Survey: Tables for Data Year 2017 (https://ncses.nsf.gov/pubs/nsf21303). Individual data tables and tables with relative standard errors and imputation rates from the 2017 survey are available upon request from the Survey Manager.

Measuring Business Innovation

The survey questions are based on the Oslo Manual (2005 edition), developed by the Organisation for Economic Co-operation and Development (OECD) and Eurostat (the Statistical Office of the European Union), which provides internationally recognized definitions and guidelines for measuring innovation.[6]

In the 2005 Oslo framework, "innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations."[7,8] Further, "The minimum requirement for an innovation is that the product, process, marketing method or organizational method must be new or significantly improved to the firm. This includes products, processes, and methods that firms are the first to develop and those that have been adopted from other firms or organizations."[9]

Notes

1 The 4.6 million for-profit companies were active in 2017 and not necessarily during the 2015–17 time period.

2 Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat). 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. 3rd ed. Paris.

3 Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat). 2018. *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation.* 4th ed. Paris.

4 None of the product innovation rates for the states were significantly greater than 20%.

5 R&D activity is based on unedited company responses to innovation questions, not R&D expenditures. R&D expenditures on the ABS are asked only of companies with one to nine employees and in certain industries. R&D activity is asked of all companies regardless of number of employees or industry. For a complete discussion of R&D expenditures see the following InfoBrief: Kindlon A; National Center for Science and Engineering Statistics (NCSES). 2020. *Microbusinesses Had More Than $6.7 billion in R&D Costs in the United States in 2017, According to New Annual Business Survey*. NSF 21-302. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf21302/.

6 Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat). 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. 3rd ed. Paris.

7 Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat). 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. 3rd ed., p. 46. Paris.

8 After the ABS was launched, the Oslo Manual was updated and revised. It included a revised definition of business innovation. Specifically, in the updated 2018 Oslo framework, “A business innovation is a new or improved product or business process (or combination thereof) that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm.” Subsequent ABS surveys utilize the revised definition.

9 Organisation for Economic Co-operation and Development (OECD) and Statistical Office of the European Communities (Eurostat). 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. 3rd ed., p. 46. Paris.

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