

TABLE 102

Impact of specialized software technology on worker types, by industry: 2016–18

(Number and percent)

Industry	NAICS code	Companies (number)	Production workers				Nonproduction workers				Supervisory workers				Nonsupervisory workers				
			Increased	Decreased	Did not change	Did not employ	Increased	Decreased	Did not change	Did not employ	Increased	Decreased	Did not change	Did not employ	Increased	Decreased	Did not change	Did not employ	
All industries	11, 21–23, 31–33, 42–81	1,818,697	5.5	1.4	53.6	39.5	4.4	1.6	66.4	27.6	4.2	1.0	68.0	26.8	5.1	1.5	68.6	24.8	
Manufacturing industries	31–33	88,457	10.1	3.6	77.4	8.9	7.8	2.3	80.5	9.4	5.9	1.8	82.2	10.1	6.7	2.1	81.1	10.1	
Food	311	4,753	8.4	3.0	80.3	8.3	5.2	4.5	80.2	10.1	7.1	2.3	81.7	8.9	4.6	4.3	83.0	8.1	
Beverage and tobacco products	312	3,363	8.5	1.2	77.8	12.5	9.3	1.3	81.5	7.9	9.3	0.6	79.5	10.6	8.2	1.7	r 81.6	8.5	
Textile, apparel, and leather products	313–16	3,283	5.9	3.7	76.7	13.7	4.7	4.4	74.2	16.7	3.2	3.0	r 76.0	17.8	4.0	3.8	r 75.7	16.5	
Wood products	321	3,209	13.7	7.2	73.9	5.2	10.0	2.0	80.6	7.4	7.4	2.0	83.9	6.7	9.3	2.1	79.3	9.3	
Paper	322	1,033	9.5	r 6.8	r 77.3	6.4	r 11.1	r D	77.0	11.2	r 3.4	r D	90.2	5.9	r 9.1	r 0.0	85.0	5.9	r
Printing and related support activities	323	10,799	6.8	4.4	78.8	10.0	4.9	2.3	80.1	12.7	3.5	1.3	78.4	16.8	3.7	1.4	78.8	16.1	
Petroleum and coal products	324	201	5.5	0.0	94.5	0.0	4.0	r D	95.0	0.0	2.0	D	96.5	0.0	2.0	D	96.5	0.0	
Chemicals	325	2,942	11.5	3.3	78.5	6.7	12.8	2.8	r 78.7	5.7	8.1	0.7	r 85.2	6.0	10.8	0.8	82.8	5.6	
Pesticide, fertilizer, and other agricultural chemical manufacturing	3253	189	D	D	92.6	D	D	0.0	86.8	12.2	r D	0.0	88.4	D	D	D	85.7	D	
Pharmaceuticals and medicines	3254	572	13.6	2.6	r 77.9	5.9	12.8	1.2	84.3	1.7	r 6.5	1.4	89.3	2.8	r 10.0	1.0	r 86.2	2.8	r
Soap, cleaning compound, and toilet preparation manufacturing	3256	548	6.2	D	76.1	15.5	r 9.9	D	74.5	13.5	r 6.9	D	79.4	13.3	r 5.3	D	78.3	14.2	r
Other chemicals	other 325	1,631	13.9	4.0	r 78.1	4.0	15.3	4.0	r 77.1	3.6	10.1	r D	85.3	3.9	14.0	D	82.7	3.1	
Plastics and rubber products	326	3,745	13.9	4.9	78.4	2.8	14.6	3.5	r 78.0	3.9	10.9	3.1	r 82.5	3.5	12.0	3.6	r 79.8	4.6	
Nonmetallic mineral products	327	2,209	10.1	3.3	78.2	8.4	8.7	2.2	80.2	8.9	7.4	1.0	r 84.5	7.1	6.7	2.7	r 81.6	9.0	
Primary metals	331	1,042	6.0	2.0	83.7	8.3	r 5.4	1.4	85.1	8.1	r 4.9	1.1	85.6	8.4	r 4.3	1.8	r 84.3	9.6	r

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Fabricated metal products	332	20,037	11.7	3.1	77.7	7.5	8.3	1.4	83.1	7.2	7.3	1.6	83.9	7.2	7.2	1.6	83.7	7.5	
Machinery	333	8,900	9.1	2.9	r 76.8	11.2	7.6	1.3	r 82.3	8.8	4.3	2.1	r 82.8	10.8	6.2	1.6	82.3	9.9	
Computer and electronic products	334	4,631	8.0	2.5	78.1	11.4	6.8	3.2	82.2	7.8	5.3	2.3	83.4	9.0	5.0	3.0	83.4	8.6	
Communications equipment	3342	574	5.4	1.2	r 79.3	14.1	4.9	1.6	86.0	7.5	r 5.6	D	88.2	6.1	r 5.1	1.4	88.3	5.2	r
Semiconductor and other electronic components	3344	1,427	10.8	2.5	r 77.5	9.2	8.3	3.6	81.0	7.1	6.9	3.4	82.0	7.7	4.3	4.1	r 83.8	7.8	
Navigational, measuring, electromedical, and control instruments	3345	1,928	7.2	3.2	79.0	10.6	6.2	3.3	84.0	6.5	5.0	2.6	82.4	10.0	5.8	3.3	82.1	8.8	
Other computer and electronic products	other 334	703	6.4	1.8	r 76.1	15.7	7.3	r 3.0	r 76.6	13.1	2.4	r 0.9	85.1	11.5	4.1	r 1.6	82.0	12.2	
Electrical equipment, appliances, and components	335	1,872	11.1	3.0	r 77.8	8.1	11.9	1.1	r 81.0	6.0	5.6	1.5	86.0	6.9	10.0	1.2	81.9	6.9	
Transportation equipment	336	2,758	16.7	2.9	73.2	7.2	10.1	4.2	r 78.3	7.4	6.8	3.7	r 81.2	8.3	11.2	2.2	78.9	7.7	
Automobiles, bodies, trailers, and parts	3361–63	1,766	13.5	3.4	76.0	7.1	r 7.8	4.8	r 79.4	8.0	r 4.3	4.6	r 83.5	7.6	r 9.2	2.3	r 81.3	7.1	r
Aerospace products and parts	3364	476	22.3	2.1	r 68.4	7.1	15.4	2.7	r 76.2	5.7	10.0	r 2.3	r 77.7	10.0	r 14.6	2.9	r 72.5	10.0	
Other transportation	other 336	515	22.2	r 1.6	r 68.7	7.4	12.9	r 4.1	r 76.0	7.0	12.8	r 1.9	76.4	8.9	14.8	r D	77.3	7.2	
Furniture and related products	337	5,208	11.3	4.3	74.7	9.7	7.5	3.5	76.4	12.6	4.1	1.8	r 83.0	11.1	6.5	3.4	79.1	11.0	
Miscellaneous	339	8,474	9.5	4.4	75.9	10.2	5.3	2.2	79.1	13.4	4.3	1.5	r 80.3	13.9	5.3	2.3	77.5	14.9	
Medical equipment and supplies	3391	3,192	17.0	5.1	68.5	9.4	5.4	2.1	r 77.4	15.1	5.7	1.4	r 80.0	12.9	5.8	2.5	74.0	17.7	
Other miscellaneous manufacturing	3399	5,281	5.1	4.0	80.3	10.6	5.2	2.3	r 80.1	12.4	3.5	1.6	r 80.3	14.6	4.9	2.1	79.9	13.1	

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Nonmanufacturing industries	11, 21–23, 42–81	1,730,242	5.3	1.3	52.4	41.0	4.2	1.6	65.7	28.5	4.1	0.9	67.4	27.6	5.0	1.4	68.0	25.6				
Agriculture, forestry, fishing, and hunting	11	4,216	6.3	D	66.3	26.1	2.0	r	D	68.4	28.4	4.2	D	69.4	25.1	4.5	0.0	69.9	25.6			
Mining, extraction, and support activities	21	3,992	1.7	2.0	r	72.2	24.1	0.7	0.5	84.5	14.3	0.6	1.6	r	81.3	16.5	1.5	r	1.7	r	82.3	14.5
Utilities	22	1,058	2.2	0.6	62.3	34.9	2.0	1.0	70.6	26.4	2.6	0.9	71.9	24.6	3.2	1.2	74.1	21.5				
Construction	23	153,792	8.4	1.1	61.4	29.1	5.1	2.0	69.6	23.3	7.1	1.0	72.9	19.0	6.4	1.2	73.8	18.6				
Wholesale trade	42	80,452	6.2	1.7	55.7	36.4	7.3	2.3	71.6	18.8	5.4	1.3	73.3	20.0	6.1	2.2	71.7	20.0				
Retail trade	44–45	169,897	4.4	1.8	54.6	39.2	4.3	1.9	69.7	24.1	3.9	1.1	71.9	23.1	4.6	1.6	73.3	20.5				
Transportation and warehousing	48–49	41,847	6.3	1.1	46.3	46.2	5.6	1.7	61.3	31.4	5.7	0.9	65.1	28.3	5.8	1.8	66.1	26.3				
Information	51	36,310	5.1	2.5	57.1	35.3	5.2	2.3	67.5	25.0	5.0	1.7	69.1	24.2	6.6	2.0	66.8	24.6				
Publishing	511	10,789	5.1	3.3	60.5	31.1	6.7	2.7	70.8	19.8	5.9	3.6	71.5	19.0	8.3	2.7	70.6	18.4				
Newspaper, periodical, book, and directory publishers	5111	5,223	2.0	5.8	63.5	28.7	2.4	r	3.5	71.5	22.6	1.4	5.9	70.0	22.7	3.5	4.2	70.6	21.7			
Software publishers	5112	5,565	8.1	1.0	r	57.6	33.3	10.7	2.0	70.1	17.2	10.1	1.5	r	72.9	15.5	12.8	1.2	70.7	15.3		
Telecommunications	517	3,218	5.5	3.8	r	56.0	34.7	4.6	5.2	73.0	17.2	5.5	2.6	r	76.0	15.9	6.6	4.4	71.8	17.2		
Data processing, hosting, and related services	518	6,165	10.2	2.3	55.1	32.4	11.2	1.5	67.9	19.4	9.1	0.9	72.6	17.4	13.8	1.5	66.7	18.0				
Other information	other 51	16,138	3.0	1.9	55.7	39.4	1.9	1.7	64.3	32.1	2.9	0.5	64.7	31.9	2.7	1.3	63.2	32.8				
Finance and insurance	52	108,580	4.7	1.2	50.0	44.1	4.3	1.6	65.5	28.6	2.9	0.8	65.4	30.9	4.4	1.3	67.3	27.0				
Real estate and rental and leasing	53	101,319	3.1	0.8	42.8	53.3	3.1	1.1	57.1	38.7	3.0	0.6	58.2	38.2	3.3	1.3	57.8	37.6				
Lessors of nonfinancial intangible assets (except copyrighted works)	533	669	0.0	0.0	49.5	50.5	8.7	r	D	48.9	33.8	D	D	72.5	10.6	r	D	D	80.7	10.6	r	

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Other real estate and rental and leasing	other 53	100,648	3.1	0.8	42.8	53.3	3.0	1.0	57.2	38.8	2.9	0.5	58.2	38.4	3.3	1.2	57.7	37.8
Professional, scientific, and technical services	54	397,321	4.7	1.1	49.0	45.2	3.7	1.2	63.6	31.5	3.1	0.6	63.4	32.9	4.6	1.2	64.3	29.9
Legal services	5411	84,212	3.0	0.8	38.1	58.1	2.6	1.3	58.9	37.2	2.2	0.5	56.5	40.8	3.5	1.3	61.9	33.3
Accounting, tax preparation, bookkeeping, and payroll services	5412	75,646	3.3	1.1	45.6	50.0	2.9	1.0	63.1	33.0	1.7	0.4	62.5	35.4	3.3	1.3	64.8	30.6
Architectural, engineering, and related services	5413	57,394	6.5	0.9	60.9	31.7	4.3	1.1	70.9	23.7	3.6	0.4	74.2	21.8	4.8	0.9	72.4	21.9
Specialized design services	5414	14,719	4.1	0.7	44.2	51.0	1.2	D	54.9	43.6	1.4	D	50.7	47.9	2.3	D	51.4	46.2
Computer systems design and related services	5415	61,904	6.7	0.9	57.6	34.8	4.8	0.9	67.3	27.0	4.2	0.8	68.7	26.3	6.1	1.0	66.9	26.0
Management, scientific, and technical consulting services	5416	55,062	5.1	1.4	45.3	48.3	5.1	1.6	58.6	34.7	4.2	1.2	58.5	36.1	6.0	1.5	57.4	35.1
Scientific research and development services	5417	4,838	7.2	1.0	57.5	34.3	6.5	1.3	75.4	16.8	6.6	1.1	76.3	16.0	8.8	1.2	75.0	15.0
Advertising, public relations, and related services	5418	13,660	4.9	2.3	51.1	41.7	5.3	2.5	62.3	29.9	3.6	1.1	64.9	30.4	4.9	2.1	63.0	30.0
Other professional, scientific, and technical services	5419	29,847	4.3	1.2	55.1	39.4	3.3	1.4	68.2	27.1	3.8	0.7	66.0	29.5	4.7	0.9	67.7	26.7
Management of companies and enterprises	55	764	D	D	33.2	59.6	D	0.0	66.2	27.0	0.0	D	61.1	32.2	D	0.0	66.2	27.0
Administrative and support and waste management and remediation services	56	92,899	8.3	1.7	51.0	39.0	5.9	2.2	63.5	28.4	6.6	1.3	66.8	25.3	7.6	1.4	66.0	25.0

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Educational services	61	23,595	3.5	0.6	r	38.9	57.0	5.4	0.4	r	59.0	35.2	4.9	0.5	r	61.0	33.6	7.0	1.0	62.4	29.6
Health care and social assistance	62	259,822	4.8	1.0		51.0	43.2	4.0	1.2		66.6	28.2	3.6	0.8		68.3	27.3	4.8	1.2	69.6	24.4
Health care services	621–23	240,008	4.6	1.0		52.4	42.0	3.8	1.2		67.5	27.5	3.4	0.8		68.5	27.3	4.6	1.2	70.0	24.2
Social assistance	624	19,813	6.2	0.9	r	35.2	57.7	5.7	1.0		56.4	36.9	6.5	1.4	r	65.0	27.1	7.6	1.1	64.5	26.8
Arts, entertainment, and recreation	71	32,812	2.2	1.6		42.8	53.4	3.5	1.7		58.5	36.3	3.3	1.4		59.3	36.0	3.9	1.6	62.4	32.1
Accommodation and food services	72	114,110	5.7	2.1		60.1	32.1	3.2	2.4		67.3	27.1	4.6	1.9		73.4	20.1	4.4	2.7	72.5	20.4
Other services	81	107,459	6.2	1.6		58.5	33.7	3.0	1.3		66.8	28.9	3.4	0.5		67.9	28.2	4.5	1.4	68.6	25.5

D = withheld to avoid disclosing data for individual companies; data are included in higher-level totals. r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is 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, 2019 Annual Business Survey: Data Year 2018.