

TABLE 104

## Impact of robotics technology on skill level of workforce, by industry: 2016–18

(Number and percent)

Industry	NAICS code	Companies (number)	Number of workers			Skill level of workers			STEM skills of workers			
			Increased	Decreased	Did not change	Increased	Decreased	Did not change	Increased	Decreased	Did not change	Did not employ
All industries	11, 21–23, 31–33, 42–81	88,422	10.0	8.1	81.9	23.7	2.3	74.0	20.3	1.6	54.5	23.6
Manufacturing industries	31–33	20,540	11.8	13.6	74.6	28.5	2.7	68.8	24.4	2.0	59.4	14.2
Food	311	1,051	11.8	r 29.6	58.6	30.2	1.0	68.8	15.9	0.7	61.3	22.2
Beverage and tobacco products	312	423	25.5	24.3	r 50.2	49.9	D	48.5	36.2	D	46.8	14.9
Textile, apparel, and leather products	313–16	378	9.3	r 21.2	r 69.5	30.2	D	56.9	21.5	0.0	41.6	36.9
Wood products	321	650	1.2	20.5	r 78.3	24.6	D	75.4	22.8	D	54.0	23.1
Paper	322	311	3.9	7.4	88.7	9.0	D	89.7	8.0	D	59.2	32.5
Printing and related support activities	323	680	11.9	r 9.0	r 79.2	25.9	0.0	74.1	17.2	0.0	38.4	44.3
Petroleum and coal products	324	23	D	D	78.3	r 21.7	D	65.2	r 18.2	0.0	81.8	r 0.0
Chemicals	325	628	13.0	9.9	77.1	33.3	D	66.7	22.3	D	68.3	9.4
Pesticide, fertilizer, and other agricultural chemical manufacturing	3253	40	0.0	12.8	87.2	D	0.0	85.0	D	0.0	50.0	r D
Pharmaceuticals and medicines	3254	143	6.3	r 14.0	r 79.7	32.9	D	67.1	33.4	r D	61.0	5.6
Soap, cleaning compound, and toilet preparation manufacturing	3256	158	4.3	6.9	r 88.7	45.2	r 0.0	54.8	r 11.4	0.0	78.5	10.1
Other chemicals	other 325	288	22.7	10.0	r 67.2	29.4	0.0	70.6	25.5	0.0	67.9	6.6
Plastics and rubber products	326	1,817	15.6	20.4	64.1	32.7	4.1	r 63.2	29.8	3.5	r 54.2	12.5
Nonmetallic mineral products	327	476	8.8	27.7	63.5	24.4	4.2	r 71.5	21.6	0.0	60.6	17.9
Primary metals	331	532	6.0	10.9	r 83.0	16.4	D	82.9	19.4	D	67.5	12.8
Fabricated metal products	332	5,100	9.5	9.5	81.0	22.6	3.2	r 74.2	19.9	1.5	r 66.8	11.8
Machinery	333	3,190	14.1	8.2	77.7	34.0	1.9	r 64.1	27.8	3.4	r 63.2	5.6
Computer and electronic products	334	1,318	13.7	11.8	74.5	34.6	3.7	r 61.7	32.1	0.8	r 54.5	12.6
Communications equipment	3342	75	D	25.3	r 61.3	30.7	r D	46.7	30.7	r 0.0	53.3	r D
Semiconductor and other electronic components	3344	498	11.4	12.9	75.7	27.8	4.4	r 67.8	24.1	D	60.8	13.5
Navigational, measuring, electromedical, and control instruments	3345	589	17.3	r 11.5	71.2	44.1	D	54.2	41.9	D	49.6	8.1
Other computer and electronic products	other 334	156	8.3	r 1.9	89.8	22.6	r 0.0	77.4	20.8	r 0.0	54.5	24.7
Electrical equipment, appliances, and components	335	432	24.0	12.4	r 63.6	21.9	4.2	r 73.9	22.5	D	67.8	7.2
Transportation equipment	336	1,157	10.8	17.9	71.3	35.0	0.6	64.4	31.1	5.4	r 55.9	7.6
Automobiles, bodies, trailers, and parts	3361–63	940	8.8	19.9	71.3	34.6	0.4	r 65.0	30.6	D	56.9	6.2
Aerospace products and parts	3364	155	17.1	8.2	r 74.7	38.1	r D	60.6	36.3	0.0	51.6	12.1
Other transportation	other 336	62	D	11.3	r 59.7	r 34.9	r 0.0	65.1	D	D	48.4	r 21.0
Furniture and related products	337	881	8.4	19.6	r 72.0	27.9	7.4	r 64.7	32.5	D	48.7	12.6

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			Increased	Decreased	Did not change	Increased	Decreased	Did not change	Increased	Decreased	Did not change	Did not employ						
Miscellaneous	339	1,492	14.1	r	8.4	77.5	26.9	1.5	r	71.6	24.6	D	53.3	21.4				
Medical equipment and supplies	3391	854	20.3	r	8.2	71.6	32.8	2.7	r	64.5	32.8	D	41.9	24.0				
Other miscellaneous manufacturing	3399	639	5.8		8.9	r	85.3	19.2	D	80.4	13.8	0.0	68.4	17.8	r			
Nonmanufacturing industries	11, 21–23, 42–81	67,883	9.4		6.5	84.1	22.2	2.2	75.6	19.1	1.5	52.9	26.5					
Agriculture, forestry, fishing, and hunting	11	259	0.0		35.4	r	64.6	D	0.0	99.6	D	0.0	62.5	37.5	r			
Mining, extraction, and support activities	21	233	3.0	r	2.6	r	94.4	7.7	0.0	92.3	6.4	0.0	67.4	26.2	r			
Utilities	22	36	0.0		D	88.9	19.4	r	D	72.2	r	13.9	r	D	61.1	r	13.9	r
Construction	23	7,354	10.8		7.7	81.5	23.9	2.3	73.8	21.5	1.9	r	52.5	24.1				
Wholesale trade	42	5,924	8.8		8.0	83.2	24.8	1.9	r	73.3	22.0	1.1	r	57.8	19.1			
Retail trade	44–45	10,449	8.6		10.6	80.8	21.8	5.1	73.1	13.7	2.9	53.8	29.6					
Transportation and warehousing	48–49	983	7.0	r	1.9	r	91.1	18.3	D	81.6	23.7	D	46.6	29.6				
Information	51	1,513	9.1		2.0	r	88.9	20.8	D	78.9	24.4	D	50.1	25.5				
Publishing	511	409	11.7	r	D	88.3	15.4	r	0.0	84.6	15.8	0.0	46.7	37.5				
Newspaper, periodical, book, and directory publishers	5111	97	D		D	92.8	16.7	r	0.0	83.3	20.0	r	0.0	42.1	r	37.9	r	
Software publishers	5112	312	13.5	r	0.0	86.5	15.4	r	0.0	84.6	14.4	r	0.0	48.3	37.4			
Telecommunications	517	110	D		D	90.9	36.1	r	0.0	63.9	36.0	r	0.0	38.7	25.2	r		
Data processing, hosting, and related services	518	316	20.3		D	73.7	26.6	D	73.1	31.0	D	56.6	12.0	r				
Other information	other 51	676	2.5	r	1.3	96.2	19.1	D	80.9	24.7	0.0	50.8	24.6					
Finance and insurance	52	1,529	3.8	r	3.9	r	92.3	13.5	D	84.0	13.6	0.0	52.9	33.5				
Real estate and rental and leasing	53	1,244	D		7.0	r	88.8	19.1	D	74.2	15.7	D	49.0	32.0				
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Other real estate and rental and leasing	other 53	1,244	D		7.0	r	88.8	19.1	D	74.2	15.7	D	49.0	32.0				
Professional, scientific, and technical services	54	15,401	10.4		3.1	86.5	24.6	1.0	74.4	24.8	0.8	55.7	18.7					
Legal services	5411	384	0.0		D	89.8	D	0.0	98.2	D	0.0	27.1	r	63.5				
Accounting, tax preparation, bookkeeping, and payroll services	5412	423	2.8		D	95.7	13.2	r	0.0	86.8	13.2	r	0.0	38.9	47.9			
Architectural, engineering, and related services	5413	7,090	12.1		3.4	84.5	29.3	1.7	69.0	27.4	1.5	r	63.3	7.8				
Specialized design services	5414	414	D		D	97.8	19.6	D	80.0	18.1	0.0	26.3	55.6					
Computer systems design and related services	5415	3,134	10.0		4.3	85.7	23.7	0.1	r	76.2	21.9	0.3	r	58.7	19.1			
Management, scientific, and technical consulting services	5416	2,057	10.3		D	89.3	18.9	D	81.0	24.6	D	48.4	26.9					
Scientific research and development services	5417	980	14.3		3.7	82.0	28.8	1.5	r	69.7	34.6	0.9	r	58.4	6.1			
Advertising, public relations, and related services	5418	323	D		D	98.8	1.9	0.0	98.1	4.3	r	0.0	41.2	54.5				
Other professional, scientific, and technical services	5419	596	8.9	r	D	90.1	23.8	0.0	76.2	25.4	0.0	30.3	44.2					

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Management of companies and enterprises	55	97	r	0.0	D	46.4	r	D	0.0	99.0	0.0	0.0	100.0	0.0		
Administrative and support and waste management and remediation services	56	2,630		20.1	7.6	r	72.3	22.4	3.5	r	74.1	12.2	D	50.1	37.4	
Educational services	61	581		D	0.0		92.6	16.9	r	0.0	83.1	24.1	0.0	61.0	14.8	
Health care and social assistance	62	11,349		7.7	2.0		90.3	20.9		D	78.4	18.0	D	55.5	25.7	
Health care services	621–23	11,050		7.9	2.0		90.1	21.4		D	77.8	18.5	D	55.8	24.9	
Social assistance	624	299		0.0	0.0		100.0	0.0		0.0	100.0	0.0	0.0	44.8	55.2	
Arts, entertainment, and recreation	71	753		D	19.3	r	74.8	23.8		D	70.3	29.2	0.0	37.3	33.6	
Accommodation and food services	72	3,433		16.7	15.4		67.9	23.4		D	73.9	15.0	4.4	r	33.5	47.0
Other services	81	4,110		4.6	r	7.7	r	87.7	18.9		D	79.0	13.3	D	48.8	35.8

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

NAICS = 2017 North American Industry Classification System; STEM = science, technology, engineering, and mathematics.

**Note(s):**

Detail may not add to total because of rounding. Detail may exceed total because companies could select more than one response. 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.