

TABLE 45-A

## R&amp;D paid for by the company and others and performed by the company outside of the United States, by selected location, industry, and company size: 2020 (part A)

(Millions of U.S. dollars)

Industry and company size	NAICS code	Total outside the United States	Puerto Rico <sup>a</sup>	Canada	Austria	Belgium	Czechia	Denmark	Finland	France	Germany	Hungary	Ireland	Italy	Luxembourg	Netherlands	Norway	Poland	Russia	Spain	Sweden	Switzerland	Turkey	United Kingdom	Other European locations
All industries	21-23, 31-33, 42-81	109,705	533 i	7,586	521	2,683	503	656	658	3,633	8,600	258	5,229	1,643	244	2,845	392	1,020	573	1,584	1,402	5,097	250	12,284	2,550
Manufacturing industries	31-33	66,243	512 i	3,693	395	2,359	194	428	401	2,082	6,573	104	3,009	1,288	166	1,210	303	647	322	708	574	3,326	113	5,234	1,412
Food	311	1,153 - 1,161	0 - 259	41	3	13	4	8	*	59	53	3	1	9	0	20	7	28	15	14	2	19	14	99	54
Beverage and tobacco products	312	759	0	0 - 75	0	20	0	0	0	0	*	0	8	47	0	0	0	0	7	2	0	409	0	51	7
Textile, apparel, and leather products	313-16	152	0	2	0	16 i	2	0	4	18	8	0	0	3	0	3	0	0	0	0	3	30	0	5	9
Wood products	321	8	0	0 - 7	0	0 - 7	0	0	0	2	0 - 7	0	0	0	0	0	0	0	0	0	1 i	0	0	0	0
Paper	322	93	0	0 - 63	0	0	0	0	1	2	9	0	0	* i	0	1	0	1	1 i	* i	*	1	1	4 i	1 i
Printing and related support activities	323	10	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum and coal products	324	165	0	0 - 105	*	0 - 39	0	3	0	4	7	0	0	0 - 11	0	6	0 - 5	0	0	*	*	*	0	42	*
Chemicals	325	19,362	76 - 118	587	182 i	1,960	31	160	43	669	1,497	31	1,398	387	149	540	44	127	136	339	151	1,908	77	2,175	784
Basic chemicals	3251	846	0	0 - 24	1	48	2	7	3	63	135	*	9	77	0	47	1	1	*	20	3	27	7	96	9
Resin, synthetic rubber, and artificial synthetic fibers and filaments	3252	512	0	4	3 i	25	0	0	*	8	47	0	0	12	149	26	0	*	1	3	0	5	*	14	24
Pesticide, fertilizer, and other agricultural chemicals	3253	92 - 108	0 - 35	2	0 - 4	0	0	0 - 20	0	6	6	*	0	1	0	3	0	*	*	1	0	*	0 - 5	2	1
Pharmaceuticals and medicines	3254	16,761	77	540	176 i	1,776	29	135	39	554	1,084	30	1,387	288	0	429	42	118	132	312	146	1,855	66	1,887	738
Soap, cleaning compound, and toilet preparation	3256	767	0 - 21	20 i	*	102	*	0	*	24	179	1	0	3	0	9	0	3	1	1	0	16	1	118	2
Paint, coating, adhesive, and other chemicals	3255, 3259	370 - 385	0	0 - 24	0 - 4	9	*	0 - 20	1	14	46	*	2	6	*	27 i	*	4	1	2	2	5	0 - 5	58	9
Plastics and rubber products	326	529	0	19 i	0	11 i	1	0	2	63	91 i	1	2	38	5	9 i	0	2	1	5	*	9	0	15	26
Nonmetallic mineral products	327	206 i	0	0 - 140	0	4	*	1 i	0	16 i	0 - 59 i	0	0	0	0	0	0 - 5	5 i	4 i	*	0	14	0	0 - 36	2
Primary metals	331	32	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	*	0	0	1	4
Fabricated metal products	332	349	0	30	6	3	10	1	5	6	35	*	*	6	0	3	2 i	3	*	2	*	28	0	36	*
Machinery	333	4,285	0 - 43	124	30 i	28	2	65	79	366	734	3	9	225	0	104	61 i	31 i	3	37	53	52	*	321	39
Agricultural implement	33311	639 - 681	0	0 - 110	1	0 - 13	*	10	0 - 80	0 - 183	0 - 615	*	0	13	0	20 i	0	*	*	8	*	0 - 31	*	0 - 271	2
Semiconductor machinery	333242	1,027	0	7	26 i	16	0	0	0	2	54 i	0	4	8 i	0	1 i	0	0	0	0	0	0	0	3	10
Engine, turbine, and power transmission equipment	3336	558	0	9	1	*	*	44	0	183	67	1	*	20	0	19	0	1	0	14	0	22	*	49	0
Other machinery	other 333	2,021 - 2,062	0 - 43	0 - 110	2	0 - 13 i	2	11	0 - 80 i	0 - 183 i	0 - 615	1	5	185	0	63	61 i	30 i	3	15	53	0 - 31	0	0 - 271	28
Computer and electronic products	334	26,567	137 - 408 i	1,934	115	123	95	160	225	471	1,695	23	1,232	214	4	227	146	251	92	203 i	222	388	8	1,279	353

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Communications equipment	3342	3,388	*	613	0-43	29	14	24	24	65	121	0-11	73	61	*	38	15-101	74	2	7	42	35	0-3	213	49	
Semiconductor and other electronic components	3344	13,023	2	833	73	45	23	51	77	200	567	4	386	93	0	47	40	162	79	32	23	57	6	463	i 81	
Navigational, measuring, electromedical, and control instruments	3345	3,146	*	314	0-43	37	46	48	122	127	525	10	16	38	4	108	6-90	0-17	7-13	27	139	221	0	358	117	
Electromedical, electrotherapeutic, and irradiation apparatus	334510, 334517	498	i 0	0-42	0	4	*	*	27	i 23	90	i 0	1	5	0	2	0	0	8	*	7	106	i 0	103	24	i
Search, detection, navigation, guidance, aeronautical, and nautical system and instrument	334511	684	*	210	*	11	0-47	0-49	0	17	0-341	0	*	6	0	12	7	0	0	0-28	0-133	0-116	0	69	5	
Other measuring and controlling device	other 3345	1,964	0	61-105	0-43	22	0-47	0-49	95	88	93-436	10	15	27	4	94	0-83	0-17	0-5	0-28	0-133	0-116	0	185	88	
Other computer and electronic products	other 334	7,010	134-407	i 173	0-43	11	11	37	2	79	482	0-11	757	23	0	34	*	0-17	0-5	137	i 17	75	0-3	245	105	
Electrical equipment, appliances, and components	335	1,794	0-25	358	i 20	10	1	1	7	74	251	2	12	105	0	14	8	24	3	2	*	72	2	128	25	
Transportation equipment	336	6,515	0	359	1	63	25	2	0	125	1,547	21	8	196	7	168	0	163	i *	77	52	9	i 5	864	65	i
Motor vehicles, bodies, trailers, and parts	3361-63	5,789-5,801	0	265	1	63	12	0	0	75	1,424	21	6	70	i 7	166	0	139	i *	41	51	*	3	741	55	i
Aerospace products and parts	3364	509	0	40	0	0	13	2	0	26	99	0	2	125	*	2	0	22	0	0	*	*	2	104	9	
Aircraft, aircraft engine, and aircraft parts	336411-13	500	0	38	0	0	13	2	0	19	99	0	2	125	*	1	0	22	0	0	*	*	2	104	9	
Guided missile, space vehicle, and related parts	336414-15, 336419	10	0	2	0	0	0	0	0	8	0	0	0	0	0	*	0	0	0	0	0	0	0	*	0	
Military armored vehicle, tank, and tank component	336992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other transportation	other 336	206-216	0	55	0	0	* i	0	0	24	i 25	0	0	*	*	1	0	2	0	37	1	i 9	0	18	1	
Furniture and related products	337	39	0	3	0	0	0	6	0	7	2	0	0	5	0	*	0	0	0	0	*	0	0	11	i 1	
Miscellaneous	339	4,217-4,224	0-298	i 240	38	i 75-114	21	21	34	i 199	i 587-646	18	i 338	48-59	1	i 117	34	i 12	i 61	23	88	386	5	174-211	41	
Medical equipment and supplies	3391	3,822	0-162	i 162	32	i 76	12	20	34	i 186	i 588	18	i 336	49	0	115	34	i 2	61	22	73	385	4	175	27	
Other miscellaneous manufacturing	3399	396-403	0-292	0-240	6	0-39	i 9	i *	*	13	0-59	0	2	i 0-11	1	i 2	0	9	i 0	1	i 15	1	1	i 0-36	14	
Nonmanufacturing industries	21-23, 42-81	43,462	21	3,893	126	324	309	228	257	1,552	2,027	154	2,221	i 355	i 78	i 1,635	89	373	250	876	i 828	1,771	137	7,050	1,137	
Mining, quarrying, oil and gas extraction, and support activities	21	120-127	i 0	0-84	i 0	0-11	i *	i 0	0	0-84	0-84	i 0	0	0	0	0-84	2	i 0	0-11	i 0	0	0	0	40	i 0	
Utilities	22	6	0	0-2	*	0	*	0	0	0	0	0	0	0	0	0	0	*	*	*	0	0	0	*	0	
Wholesale trade	42	45	0	0-17	i 0	0	0	0	0	0	0-17	0	0	1	i 0	0-17	0	0	0	0	0	0	0	1	i *	i
Electronic shopping and electronic auctions	454111-12	97-4,884	i 0	0-392	i 0-7	i *	i 1	i 0-10	i 2	i 109	i 0-421	i *	i 850	i 14-50	i 30-76	i 0-128	i 1	i 0-34	i *	0-44	27-53	0-11	0-22	0-370	i 0-50	i
Transportation and warehousing	48-49	37	0	0-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0-34	0	0	0	0	0	0	0	

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Information	51	22,900	0 - 18	2,534	65	158	220	168	212	678	732	38 - 70	1,084	62 - 93	3 - 34	712	79	177	116	228	580	1,150	92	3,624	691	
Publishing	511	7,683	0 - 17	1,219	11	0 - 134	76	117	49	224	253	0 - 31	214	38	3	0 - 200	49	49	68	115	476	0 - 200	0 - 59	764	277	
Newspaper, periodical, book, and directory publishers	5111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Software publishers	5112	7,683	0 - 17	1,219	11	0 - 134	76	117	49	224	253	0 - 31	214	38	3	0 - 200	49	49	68	115	476	0 - 200	0 - 59	764	277	
Telecommunications	517	94	0	5	0	2	0	0 - 25	0	2	0 - 42	0	2	0	*	1	0	0 - 42	0	4	0	1	0	17	1	
Data processing, hosting, and related services	518	8,147	0 - 18	1,013	47	24	140	28	0 - 164	322	224	39	543	25	1	464	0 - 31	72	46	88	0 - 105	70	34	850	343	
Other information	other 51	6,976	0 - 18	296	7	0 - 134	3	0 - 25	0 - 164	131	211 - 257	0 - 31	325	0 - 31	0 - 31	46 - 249	0 - 31	12 - 58	2	20	0 - 105	878 - 1,081	0 - 59	1,993	70	
Finance and insurance	52	1,541	0	0 - 419	0 - 7	0 - 11	i 6	0	0	0 - 109	i 0 - 421	i 0 - 34	0 - 850	1	i *	0 - 128	0	0 - 34	i 0 - 11	0 - 44	i 56	11	0 - 22	i 308	35	i
Real estate and rental and leasing	53	163	*	0 - 110	0	*	0	0 - 10	0	8	6	0	0 - 151	*	0	*	0	0	*	*	0	*	*	0 - 151	*	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	0 - 15	0	0 - 15	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	148 - 164	*	0 - 110	0	*	0	0 - 10	0	8	6	0	0 - 151	*	0	*	0	0	*	*	0	*	*	0 - 151	*	
Professional, scientific, and technical services	54	13,744	i 3 - 22	942	56	i 157	i 82	i 51 - 61	i 44	759	870	83	i 288	i 243	i 0 - 13	797	i 7	164	i 125	i 606	i 141	i 601	24 - 38	i 2,710	363	i
Architectural, engineering, and related services	5413	20	0	2	i 0	0	0	*	0	*	*	0	0	*	0	2	i 0	0	0	0	*	i *	*	2	i 0	
Computer systems design and related services	5415	3,324	0 - 18	357	5	3	28	i 0 - 10	4	117	295	1	171	i 38	0 - 13	7	*	28	13	58	41	106	0 - 13	341	42	
Scientific research and development services	5417	10,070	i 4	532	49	i 154	i 54	i 51	i 39	607	i 558	i 82	i 117	i 197	i 0	767	i 6	135	i 112	i 545	i 98	i 493	25	i 2,326	i 296	
Research and development in nanotechnology	541713	0 - 3	0	0	0	0	0	0	0	0	0 - 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Research and development in biotechnology (except nanobiotechnology)	541714	2,929	0 - 4	118	4	33	12	9	7	106	138 - 143	13	4	58	0	24	0 - 7	36	21	74	12	455	6	908	66	
Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)	541715	7,135	i 1	414	45	i 121	i 42	i 43	i 33	502	i 416	i 69	i 113	i 139	i 0	743	i 0 - 7	i 99	i 91	i 472	i 86	i 38	i 19	i 1,418	i 230	
Research and development in the social sciences and humanities	541720	1 - 7	0 - 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other professional, scientific, and technical services	other 54	330	*	52	2	*	0	0	0	34	17	0	*	8	0	21	0	1	*	3	2	2	*	41	24	i
Health care services	621-23	18 - 22	i 0	*	*	0	0	0	0	0	*	0	0	0	0	0 - 22	i 0	0	0	0	0	0 - 22	0	0	*	0

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(Millions of U.S. dollars)

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Other nonmanufacturing	23, 44-45 (excluding 454111-12), 55-56, 624, 71-72, 81	1 - 4,789 i	0 - 18	0 - 406	*	0	0	0 - 10	0	*	0 - 421	*	0 - 850	0	0	0 - 128	0	0	0 - 11	0 - 44 i	0	0 - 11	*	0 - 370	0 - 50	
All companies (number of domestic employees)	-	109,705	533 i	7,586	521	2,683	503	656	658	3,633	8,600	258	5,229	1,643	244	2,845	392	1,020	573	1,584	1,402	5,097	250	12,284	2,550	
Small companies																										
10-19 <sup>b</sup>	-	290	0	114	*	1	*	0 - 5	*	8	5	0 - 14	*	1	0	*	0	5	*	7	*	13	0 - 14	16	9	
20-49	-	606	0 - 36	77	*	4	*	12	0	9	13	3	1	7	0	3	*	3	*	5	3	13	0	22	10	
Medium companies																										
50-99	-	798	0	32	14	13	12	0 - 5	2	6	43	0	2	4	0	7	1 i	13	5	6	29	59	0 - 24	85	38	
100-249	-	2,072	17	117	1	17	10	6	1	129	69	0 - 26	21	70	0	96	1	13	30	26	17	455	0 - 26 i	140	45	
Large companies																										
250-499	-	2,866	0 - 36	536	18	3	4	21	4	74	132	0 - 36	94	36	0 - 36	176	6	25	11	27	30	53	0 - 36	252	48	
500-999	-	3,187	0 - 36	244	12	36	6	29	45	78	209	39	75	74	0 - 82	37	21	27	60	27	52	94	0 - 61	667	114	
1,000-4,999	-	18,520	32	2,640	38	218	64	154	183	691	1,344	46	866	144	9	343	36	132	95	189	420 i	579	46	1,727	875	
5,000-9,999	-	11,845	25	840	45 i	147	46 i	139	65 i	713	754	56	500	233	8	535	60 i	229 i	67 i	165	252	335	39	1,240	140 i	
10,000-24,999	-	23,186	426 i	599	237 i	528	77	123	73 i	955 i	2,360	64 i	451 i	671	147	871	i	89	221	106 i	772 i	258	463	45	2,930 i	638 i
25,000 or more	-	46,336	0 - 36	2,387	155	1,717	284	172	285	970	3,673	0 - 53	3,218	402	0 - 82	i	776	178	351	199	359	342	3,033	62	5,207	635

\* = amount &lt; \$500,000; i = more than 50% of the estimate is a combination of imputation and reweighting to account for nonresponse.

NAICS = 2017 North American Industry Classification System.

<sup>a</sup> Puerto Rico is not included in the U.S. total due to its classification as a U.S. territory.<sup>b</sup> The Business Enterprise Research and Development Survey does not include companies with fewer than 10 domestic employees.**Note(s):**

Detail may not add to total because of rounding. Country detail was not collected from companies reporting less than \$1 million of R&amp;D paid for by the company or reporting less than \$1 million of R&amp;D paid for by others. Industry classification is based on the dominant business code for domestic R&amp;D performance, where available. For companies that did not report business codes, the classification used for sampling was assigned. Statistics are representative of companies located in the United States that performed or funded \$50,000 or more of R&amp;D and are not comparable with estimates published for years prior to 2018. An estimate range may be displayed in place of a single estimate to avoid disclosing operations of individual companies.

**Source(s):**

National Center for Science and Engineering Statistics and Census Bureau, Business Enterprise Research and Development Survey, 2020.