

Manufacturing Sector

College Hiring 2010-2011

Five hundred and sixty eight (568) manufacturing companies provided enough information to predict hiring intentions for the 2010-2011 academic year. This special Recruiting Trends report will provide a profile for the manufacturing sector based on this information. The results are presented with minimal narrative explanation. When appropriate, results from the other economic sectors have been provided for comparison (denoted in red).

Highlights:

- **Hiring targets are generally up for 2010-2011, even though uncertainty about the economy remains high.**
- **Small companies (less than 150 employees) and large companies (more than 1200 employees) are reporting increases in hiring targets.**
- **Companies representing food & beverage processing, machinery, metals, and chemicals subsectors will increase hiring.**
- **Starting salaries are averaging \$39,000 to \$59,000 depending on academic discipline.**
- **Manufacturers are looking for engineers (electrical and mechanical), computer science & IT, business, and “all Majors” to round out their talent pool.**
- **Nearly 50% of the responding manufacturing employers are from the Midwest.**

Characteristics: The average number of employees per company was reported as 10,926 (8023) with a median size of 450 (128). A breakdown by size categories indicates that manufacturing companies tend to be larger than companies from the other economic sectors.

Category	Employees	Number: Manufacturing	Percentage of Manufacturing	Percentage of Non-Manufacturing
Very Small	< 9	15	3	12
Fast Growth	10 - 100	121	21	35
Small	101 - 500	157	28	22
Medium	501 - 3999	124	22	17
Large	> 4000	150	26	14

Within the NAIC (North American Industrial Classification system) we created 23 sub-categories based on the first three digits of the NAIC number. Only one subsector was not represented among respondents: paper manufacturing. The following distribution shows the major subgroups comprising manufacturers.

Subsectors	Number of Companies in Response
Chemical (54) & Plastics & Rubber (30)	84
Primary (25) & Fabricating Metals (55)	80
Other Manufacturing (Toys, Sporting Goods, Musical Instruments, Not Classified elsewhere)	71
Food (53) & Beverage (11) Processing	64
Automotive (30) & Missiles-Aircraft (26) & Armored Vehicles (4)	60
Electrical Equipment	42
Machinery	39
Computer & Electronics	39
Surgical Equipment	26
Printing	16

Manufacturing companies are primarily located in the Midwest with these states contributing the most responses: OH (53), IL (51), WI (42), MI (41), MN (31), TX (25), KY (22), IN (21), CA (20), and FL & PA (18 each). Based on distribution across the four ACE (Association of Colleges and Employers) regions, nearly half are located within MWACE.

ACE Region	Percent of Manufacturing Response	Percent of Non-Manufacturing Response
MWACE	48	31
SOACE	26	31
MPACE	13	20
EACE	13	18

Respondents can also be described based on their primary recruiting area. For example, 29% of these companies recruited throughout the US for talent while 9% indicated that they searched globally. Based on the state distribution, the Great Lakes states have the highest concentration of regional employers while the Pacific Northwest has the lowest.

Recruiting Region	Percentage of Manufacturing Employers	Percentage of Non-Manufacturing Employers
Globally	9	6
United States	29	25
New England States	9	10
Mid-Atlantic States	11	14
Great Lakes States	37	24
Upper Plains States	13	10
Southeast States	16	18
South-central States	13	12
Southwest States	11	11
Northwest States	3	9

Employers from manufacturing concentrate their recruiting efforts at public schools (92%) as well as other types of institutions, as this table indicates. Non-manufacturing employers are more likely to recruit at historically Black Colleges and Universities and Hispanic Serving Institutions than manufacturing employers. Non-manufacturing employers are also more likely to seek talent at for-profit institutions.

Type of Institution	Percentage of Manufacturing Employers	Percentage on Non-Manufacturing Employers
2-YR for Credentials	22	21
2-YR for Associates Degree	32	30
4-YR Public	92	87
4-YR Private	64	67
2 & 4 YR For-Profit	7	13
Advanced Degree Institutions	42	47
Historic Black Colleges	15	19
Hispanic Serving Institutions	7	14

Manufacturers may identify a core set of colleges and universities to recruit. For this sample of manufacturing companies, the average core schools where they recruited was 10 to 11 with the median being five (range 0 to 400). The number of core schools varies by size as the following table suggests:

Size Category	Basic Statistical Descriptors for Core Schools
Very Small	Average 3 Median 3 Range 1 to 6
Fast Growth	Average 6 Median 3 Range 1 to 100
Small	Average 6 Median 5 Range 0 to 500
Medium	Average 11 Median 5 Range 0 to 300
Large	Average 18-19 Median 10 Range 1 to 400

Hiring staff have a variety of recruiting tools and strategies at their disposal to identify and recruit college talent. Manufacturing employers are heavy users of on-campus recruiting strategies compared to non-manufacturing employers. Seventy (70) percent of manufacturing employers have internship and co-op programs, compared to 60% of non-manufacturing employers. Manufacturing employers are more likely to hold on-campus interviews, to connect through alumni and employees, and to utilize consultants in their search for talent.

Recruiting Strategy	Percentage of Manufacturing Employers Utilizing	Percentage of Non-Manufacturing Employers Utilizing
On-campus Presentations	47	39
On-campus Interviews	46	31
On-campus Career Fairs	59	53
On-campus Resume Referral System	56	39
On-campus Faculty Connections	41	36
On-campus Web-based Employment System	81	80
Internships and Co-ops & other programs for professional experience	70	60
Organization's Web Portal	66	68
Employees and Alumni Connections	55	48
Job Fairs – off campus (can still be University sponsored)	28	25
Targeted Job Fairs	22	22
National Web-based Employment Service Provider	62	47
State & Local Job Boards	30	23
Ads in professional outlets	31	33
Consultants	40	17
Social Media (all forms)	27	28

College Labor Market Outlook: Before providing their actual hiring targets for the year, respondents were asked their perception of the college labor market (overall and then for their industry) on a scale that ranged from 1 = Poor to 5 = Excellent. Overall, manufacturing respondents believe the overall college labor market is **FAIR** (mean 2.07); however, they feel their own sector is doing better with a **FAIR** to **GOOD** rating (mean 2.42).

Hiring Intentions for 2010-2011: Entering the 2010-2011 academic year, approximately 67% of manufacturers (70%) had hired a new college graduate the previous academic year. Based on their expectations this year, 30% of manufacturers have definite plans to hire college graduates.

Intentions	Percentage of Manufacturing Employers	Percentage of Non-Manufacturing Employers
Definitely will hire	30	32
Preliminary plans to hire	24	20
Uncertain would like to hire	34	35
Will not hire	12	13

Uncertainty about the economy is prevalent in these hiring plans. Among employers who hired last year, 28% are uncertain about hiring this year. Among those who did not hire last year, uncertainty is nearly 50%.

Hiring Last Year	Definitely Hire	Preliminary Plans	Uncertain	Will Not Hire
YES	41	27	28	4
NO	10	18	45	27

Hiring Targets for 2010-2011: The following hiring projects are based on the complete information provided by 468 manufacturers. Bachelor hiring is expected to increase by 8%, compared to the 10% reported for the entire employer sample (see national report).

Degree Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year
Credentials	8.9	9.6	8
Associate	3.1	3.1	NC
Bachelor	17.0	18.3	8
MBA	5.8	6.1	5
Masters	4.8	6.3	31
PhD	8.1	8.5	5
Professional	2.4	3.6	50
Total Hires	21.1	22.9	8

Size of company: Size plays an important role in shaping college hires among manufacturers. Small employers will be increasing hiring at the bachelor's level along with the largest employers. Medium-size employers will be decreasing their hiring this year. The following results are based on the quartile groups of the entire sample to ensure that there are sufficient responses to make a reasonable projection on hiring.

Smallest Companies (30 and fewer employees)

Degree Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year
Bachelor	.7	1.1	57
Total	.7	1.5	100

Small Companies (31 to 150 employees)

Degree Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year
Credentials	1.1	1.8	64
Associate	1.0	1.4	40
Bachelor	1.2	1.8	50
Masters	1.3	1.0	-23
Total	1.9	2.7	42

Medium Companies (151 to 1200 employees)

Degree Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year
Credentials	1.4	2.2	57
Associate	1.5	2.2	47
Bachelor	5.0	4.6	-8
MBA	1.5	1.6	7
Masters	2.7	2.4	-11
PHD	2.2	1.8	-18
Total	6.5	6.3	-3

Large Companies (More than 1200 employees)

Degree Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year
Credentials	32.3	32.8	1
Associate	7.5	6.2	-17
Bachelor	33.9	36.7	8
MBA	8.2	8.6	5
Masters	6.8	9.4	38
PHD	13.1	13.8	5
Total	43.0	46.6	8

Manufacturing Subsectors: Hiring targets were extracted for the manufacturing subsectors (groups of subsectors) that supplied enough complete information that their hiring figures held together statistically. Several sectors are showing strong hiring growth, especially machinery, food and beverage processing, chemicals & plastics, and primary & fabricating metals. The other sectors are reducing hiring from last year, especially computer & electronics and the “other” group.

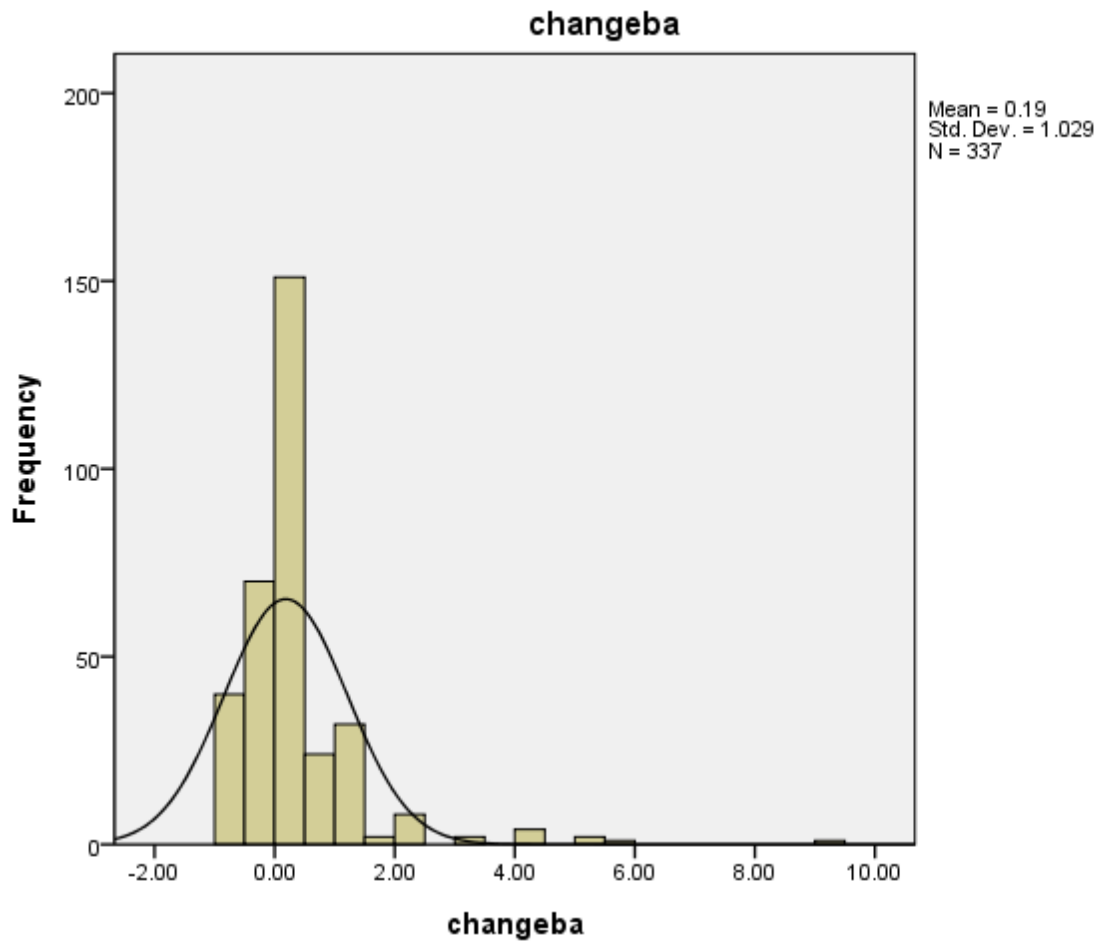
Hiring in Selected Subsectors at the Bachelor’s Level

Subsector	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year
Food & Beverage Processing	14.9	17.8	19
Chemicals & Plastics	9.9	12.3	24
Primary & Fabricating Metals	13.6	14.1	4
Autos & Aircraft & Armored Vehicles	52.6	50.9	-3
Electrical Equipment	11.5	11.1	-3
Machinery	8.7	22.2	155
Computer & Electronics	22.8	20.7	-9
Surgical Equipment	14.2	13.9	-2
Other Manufacturing	10.9	8.6	-21

The Extremes: In the national analysis, the distribution of hiring change year over year showed that an outlier group was aggressively hiring compared to the remaining employers. A similar check was conducted on the manufacturing sample. We looked at the distribution from two perspectives at the bachelor’s level. The first was percentage change from last year. In this case, we identified two outlying groups: one at the positive end and one at the negative end. The following histogram illustrated this distribution. The change analysis presents a problem in that

the calculation excludes companies that did not hire last year but are hiring this year (cannot divide by zero). In examining the difference in hiring between years, we found outliers but the diagram is harder to read.

This figure shows the distribution of the percentage change in hiring year over year for manufacturing employers who responded in 2010-2011.



The change year over year analysis revealed that 33% would be reducing their hiring targets, 35% would remain the same, and 32% would increase hiring. The positive outliers expect to increase hiring by over 100% (doubling their workforce) while those decreasing their hires expect to reduce targets by 60%. The difference analysis (which included 115 more employers) showed 25% reducing their hiring, 27% holding to last year's level, and 48% increasing their hires from last year. Positive outliers expect to increase hiring 59% while those reducing hires will do so by 28%. The following table summarizes this information.

Group	Average Bachelor Hires 09-10	Average Bachelor Hires Expected 10-11	Percentage Change Year over Year
Positive outliers: change year over year	12.2	25.7	111
Positive outliers: difference between years	32.8	52.2	59
Negative outliers: change year over year	15.7	6.2	-60
Negative outliers: Difference between years	82.6	59.2	-28

Who are Manufacturers Seeking for Their Talent Pool? As would be expected, manufacturers are heavily recruiting engineers. But clearly, business and computer science majors also appear in the mix. While over 50% of these employers are seeking engineers, nearly 1/3 will be recruiting business and computer science majors only. Listed below are the top academic majors manufacturers will be recruiting this year.

Majors	Percentage of Employers Seeking
All Majors (no specific major specified)	20
All Technical Majors (engineering and computer science, major not specified)	50
All Business Majors (specific major not specified)	30
All Liberal Arts (no specific major specified)	7
Electrical Engineers	42
Mechanical Engineers	40
Industrial Engineers	33
Accounting	32
Marketing	29

Finance & Supply Chain	26
Human Resources & Computer Science & Chemical Engineering	22
Engineering Technicians & Engineering Technology & Computer Information Systems & Management Information Systems (business)	20
Management Information Systems (computer science)	19
Computer Programming	18
MBA	27

Other majors of interest: Public Relations (10%), Chemistry (12%), Computer Engineering (15%), International Business (13%), and Materials Engineering (16%).

Types of positions being filled: Listed below are the top positions that manufacturing employers expect to fill with new college hires this year.

Type of Position	Percentage of Employers Filling this Position
Manufacturing Engineering	47
Project Management	32
Design Engineering	30
Accounting & Sales	29
Supply Chain/Logistics & Marketing & Management Training	25
Computer Services/Engineering	23
Human Resources	21
Information Management	18
Administrative Services	15
Technical Services	13

Starting Salaries: The following list of starting salaries by academic discipline is not complete. We have only included salaries where 30 or more companies have provided their salary information. There are several exceptions to this rule, such as PhD. Engineers. These few cases have been included because their statistics do not show much variation.

Associate Level

Degree	Average Starting Salary (\$)	Salary Range (\$)
All Business Majors	34,582	18K – 55K
All Technical Majors	40,385	20.8K – 75K
All Computer Science & IT	38,492	20.8K – 60K

Bachelor Level

Degree	Average Starting Salary (\$)	Salary Range (\$)
Aerospace Engineering	52,737	24.9K – 65K
Chemical Engineering	57,905	24.9K – 80K
Civil Engineering	53,958	40K – 75K
Computer Engineering	56,196	24K – 65K
Electrical Engineering	56,889	27K – 90K
Industrial Engineering	52,677	24.9K – 85K
Mechanical Engineering	54,250	24.9K – 75K
All Other Engineers	52,145	24.9K – 71K
Computer Science	51,000	24K – 74K
Computer Programming	53,116	30K – 75K
Software Development	55,919	31K – 70K
All Other Computer Science	53,200	35K – 65K
Accounting	44,118	24.9K – 65K
Finance	46,286	24.9K – 60K
Marketing	41,580	24K – 82K
Logistics/Supply Chain	45,315	24.9K – 58K
Human Resources	41,076	24.9K – 60K
Management Information Systems (business)	45,274	24.9K – 70K
Public Relations	39,243	24.9K – 50.9K
Chemistry	46,826	24.9K – 62K
All Majors	39,964	24K – 55K

Advanced Degree

Degree	Average Starting Salary (\$)	Salary Range (\$)
MBA	64,344	30K – 98K
MS - Engineering	64,963	45K – 85K
MS – Computer Science	65,700	40K – 80K
PhD - Engineering	85,477	60K – 105K

When Do Manufacturing Employers Expect to Hire? We asked employers when they planned to have completed their hiring for the 2010-2011 class. Nearly 40% indicated that hiring would be completed by the end of first semester. Nearly 45% of large employers would have hiring finished by the end of November. About 30% expect to complete their hiring by the end of

Spring semester 2011. Another 30% do not expect to begin hiring until the summer of 2011 or even later. In fact, 50% of the smallest employers do not anticipate hiring until later in 2011.

Hiring Expected To Be Completed	Percent of All Manufacturing Respondents	Percentage of Smallest Employers	Percentage of Small Employers	Percentage of Medium Employers	Percentage of Large Employers
Fall Semester 2010	39	19	38	37	44
Spring Semester 2011	29	30	29	29	29
Summer to Fall 2011	19	23	16	19	20
Spring 2012	13	28	17	15	7

We also looked at the timing of the hiring process in the selected subsectors. Several subsectors stand out having completed their hiring during the Fall semester: machinery, computer and electronics, surgical equipment, chemicals and plastics, and the “other” group.

Hiring Expected To Be Completed	Percent by Fall Semester 2011	Percent by Spring Semester 2011	Percent by Summer to Fall 2011	Percent by Spring 2012
Food & Beverage	36	37	14	13
Chemicals & Plastics	43	31	21	5
Primary & Fabricated Metals	30	27	29	14

Auto & Aircraft & Armored Vehicles	39	27	22	11
Electrical Equipment	31	29	24	14
Machinery	56	26	6	12
Computer & Electronics	44	24	15	17
Surgical Equipment	44	35	17	4
Other Manufacturing	47	28	13	12

Hiring Outlook Based on Recruiting Strategies: Using a grouping statistical procedure, the recruiting strategies listed above were sorted into four groups. The only strategy that did not cluster with any of the categories was posting position announcements on the company’s web site. In the following tables we have presented the hiring expectations for three of the four groups: events, agents (relationships), and Web/Media. The fourth group, termed the special group (includes posting on state and local job boards, placing ads in professional outlets, and hiring consultants), has not been included. For each category the percentage using different number of these strategies, hiring projects, average company size, and mean core schools visited are included.

Events: Strategies in this group include visiting campus for presentations or information nights, attending campus career fairs, conducting on-campus interviews, attending off-campus career fairs, and attending targeted career fairs. The message on hiring is mixed with those using none of these strategies reducing hires by 5% as well as those employing two (down 36%) and four (down 4%) of these strategies. The more strategies that are used the larger the company. The size of company makes two significant jumps, once after employing one strategy and again when utilizing four or more strategies. The number of schools visited also jumps significantly when three or more strategies are engaged. However, the number of strategies used does not necessarily predict increased hiring.

Number of Event Strategies Utilized	Percent of Manufacturing Companies at this Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year	Average Size of Company	Mean # of Core Campuses Company Visits (Median)
None	29	2.1	2.0	-5	2,079	4 – 5 (4)
1	14	2.5	3.2	28	3,062	6 – 7 (5)
2	13	9.2	5.9	-36	11,988	6 – 7 (5)
3	22	14.2	19.3	36	13,582	16 (5)
4	11	57.2	55.0	-4	26,299	14 – 15 (6)
5	10	35.7	41.7	17	23,209	17 (12)

Agent or Relationships: This group is comprised of these strategies: using current employees (alumni) to identify potential talent, connections with faculty, resume referral from campus sources, and internship and co-op programs. Those companies using none of these strategies will increase hiring more than 25% but they also tend to be smaller companies. The size distribution is not as skewed as for events with only a doubling in employees when moving from two to three strategies. Except for companies using only one strategy, the hiring outlook is positive. Relationship building appears to be more consistent in sustaining hiring growth than not. The number of core schools visited is much more consistent across groups though those using three strategies are visiting 14 to 16 campuses.

Number of Agent Strategies Utilized	Percent of Manufacturing Companies at this Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year	Average Size of Company	Mean # of Core Campuses Company Visits (Median)
None	10	4.5	5.7	27	2,178	8 – 9 (4)

1	20	11.4	9.6	-16	6,848	7 – 8 (5)
2	29	12.1	13.8	14	7,603	7 (5)
3	20	34.9	36.6	5	14,133	15 – 16 (5)
4	21	16.1	18.9	17	20,544	13 (6)

Web and Social Media: This group of strategies includes posting position announcements on the college or university web site, posting positions on national job boards, and using social media, such as Facebook, LinkedIn, and Twitter. Nearly all employers in manufacturing employ one of these strategies, likely to be posting on campus as 81% utilize this source. Size really matters if employing all three strategies but it does not appear to improve hiring. Social media has grabbed everyone’s attention. Social media strategy was examined separately. The results show that hiring will remain unchanged from last year (averaging 26 hires per company) for the companies using social media (average size 13,971 and mean core colleges 14).

Number of Web/Media Strategies Utilized	Percent of Manufacturing Companies at this Level	Average Hires 09-10	Average Hires Expected 10-11	Percentage Change Year over Year	Average Size of Company	Mean # of Core Campuses Company Visits (Median)
None	9	43.3	43.8	1	7,963	8 (4)
1	34	10.8	14.1	30	10,164	10 (4)
2	34	9.0	10.7	19	10,321	11 (5)
3	23	27.7	26.4	-5	38,645	10 (5.5)

Students Today Versus Students Yesterday: A frequent question often asked by media is whether students today, because of the difficulty in finding employment, better prepared for the recruitment process and transition into the workplace than those students who graduated five years ago in the middle of a strong college labor market. Employers were asked to compare these two groups on several dimensions of the recruiting process, including resume preparation and interview preparation, as well as personal or behavioral dimensions, including realistic expectations, professional maturity, and ability to express career aspirations. Each item was

measure on a five point scale (1 = much less, 3= same as, 5= much better). Overall, employers do not believe today's students are better prepared for their job search, except for resume preparation. They are especially concerned that students hold unrealistic expectations for the current economic situation and have a lower level of maturity.

Transition Dimension	Mean Ranking	Percent Less Prepared	Percent Prepared the Same	Percent Better Prepared
Resume Preparation	3.15	17	51	32
Interact with other employees	2.99	20	59	21
Interview Preparation	2.98	20	60	20
Knowledgeable of company	2.96	28	45	27
Articulate skills & competencies	2.93	23	58	32
Express career interests & direction	2.90	31	45	24
Professional Demeanor	2.75	33	54	13
Professional Maturity	2.63	41	48	11
Realistic Career Expectations	2.51	53	29	18

We would like to recognize these companies who continue to support the Recruiting Trends project and the research at the Institute.

