

ROBOTICS BUSINESS REVIEW

BUSINESS ANALYSIS FOR THE ROBOTICS AND INTELLIGENT SYSTEMS INDUSTRIES

Current State and Future Needs of the Robotics Workforce

Robotics Business Review surveyed companies that develop, resell, or use robots and robotic technology to determine the makeup of their current and future labor force, hiring trends, and training practices, with the goal of driving the robotics industry.

By Dan Kara

The term “workforce development” signifies different things to different people. For some, it means inviting children and teens to consider careers in science, engineering, or technology. Other workforce development initiatives seek to rebuild depressed economies through retraining or directed investment. Many workforce development efforts focus on training or retraining existing workers to increase their skill levels. The overarching goal of workforce development efforts, however, is the same: to develop a highly skilled, competitive workforce aligned with industry needs.

Workforce development studies are not unknown in the robotics industry, but they are less common than in other markets, with the exception of the industrial robotics sector. Many efforts emphasize educational robotics—again, not as a way to advance robotics per se, but to push careers in science, technology, and engineering. With this article, *Robotics Business Review* provides a snapshot of the state of the industry, a brief description of hiring trends, and a needs analysis and review of training practices so that business, academia, and governmental economic development groups can work together to better align robotics industry requirements with educational curricula and workforce development programs. Much emphasis is placed on peer-to-peer, business-academic interactivity as a method of achieving this goal.

For the purpose of this article, “robotics workforce” is broadly defined as the labor force for companies developing and selling robots and robotic technology, as well as organizations that use robots in their business. This article seeks to answer the following questions:

- What is the composition of the current and future robotics workforce?
- What are robotics industry expectations for revenue growth and plans for hiring?
- What are the workforce development plans for companies building, selling, or using robots and robotic technology?
- What are the current and future workforce needs for the robotics industry?
- What training and retention strategies are robotics industry companies employing?

Continued on next page

This survey was originally published in the October 2009 issue of *Robotics Business Review*.

Mark Your Calendar

Join *Robotics Trends* and the international robotics community at the inaugural event in the *Robotics Summit Virtual Conference and Exposition* series:

Autonomy, Mobility and Navigation Solutions

June 16, 2010
9:00 AM – 6:00 PM EDT

The conference features:

- Two thought provoking keynote sessions
- Eight content rich general sessions
- Full virtual conference floor featuring products and services from leading robotics companies
- Online networking opportunities

Robotics Summit events are virtual — Attend from the comfort of your home or office

Registration is FREE

To register or learn event details visit
www.robovirtualevents.com.

Editor-in-Chief Dan Kara

dkara@roboticsbusinessreview.com

Executive Editor

Cecilia Galvin
cgalvin@ehpub.com

Copy Editor

Colleen Frye

Art Director

Dorian Gittlitz

Contributors
James Gaskin, Steve McClure,
Geoffrey Oldmixon, Mikell Taylor

Publisher
Michael Siggins
msiggins@ehpub.com

Robotics Business Review
111 Speen Street, Ste. 200
Framingham, MA 01701
508-663-1500

Copyright 2010 by
Robotics Trends
a division of EH Publishing, Inc
All rights reserved

FEATURE: THE ROBOTICS WORKFORCE

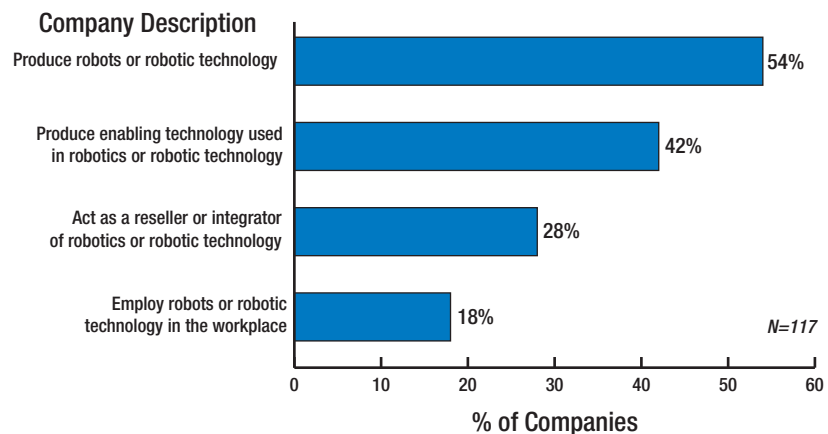
Respondent Profile

Data for the *Robotics Industry Workforce Development Study* was based on a survey instrument emailed to the attendee list of Robotics Trends' RoboDevelopment Conference and Exposition and RoboBusiness Conference and Exposition, as well as Robotics Trends' internal database of robotics companies and research institutions. Respondents were qualified if they answered "yes" to the following question:

Does your company or institution 1) produce robots or robotic technology, or 2) produce enabling technology used in robotics or robotic technology, or 3) employ robots or robotic technology in the workplace, or 4) act as a reseller or integrator of robots or robotic technology?

Respondents who replied in the affirmative to the question above were placed in a raffle for subscriptions to *Robotics Business Review*. Completed questionnaires numbered 117. As described in Figure 1, the majority of respondents produce robots or robotic technology (multiple selections were allowed), with those using robots in the workplace, as opposed to building them, running a distant fourth. Approximately 70% of the respondents indicate that their company is involved with only a single function or service.

FIGURE 1. Which of the following describes your company?



* Multiple selections allowed

The respondents are well distributed among different markets (multiple selections were allowed), with respondents' companies serving an average of 2.5 markets (Fig. 2). All four of the major classes of robotic systems are represented by survey respondents. These are:

- **Personal Service Robotics.** Personal service robots are purchased by individuals for use in the home. *Consumer robotics*, such as home care/lawn care products and smart toys, along with *educational robotics*, are subclasses of personal service robotics.
- **Professional Service Robotics.** Professional service robots and robotic technology are purchased by corporations, governments, hospitals, and other formal entities.

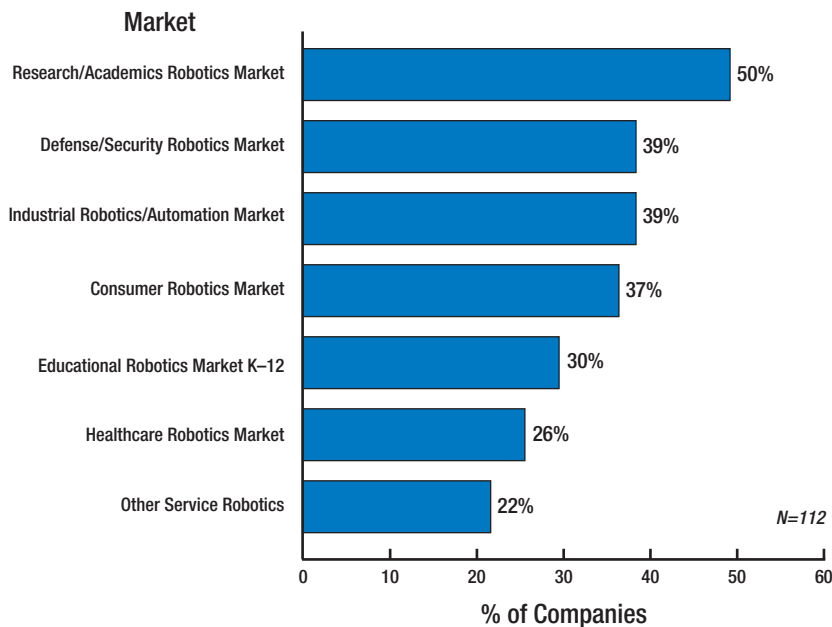
The *defense/security robotics market*, the *healthcare robotics market*, and *other service robotics* categories fall under this heading.

■ **Industrial Robotics.** As their name implies, *industrial robots* are used in industry, typically functioning in a manufacturing or factory automation role, with systems classified according to major robot design configurations such as SCARA robot, gantry robot, articulated robot, and so on.

■ **Research/Academics Robotics.** This group of robotic technology includes software and hardware platforms, especially development platforms, that are used in academic or research institutions as the basis for conducting primary robotics R&D, as well as some types of early commercialization work.

The large percentage of respondents developing, selling, or employing robotic technology for the research/academic market is a reflection of the nascent state of the robotics industry (with the exception of the industrial robotics sector). Well represented in the survey sample are the older, mature industrial robotics market and the defense/security market, which receives its primary source of funding from governments and is served by numerous small firms as well as giant primary defense contractors.

FIGURE 2. For what markets does your company develop, sell, or employ robots or robotic technology?



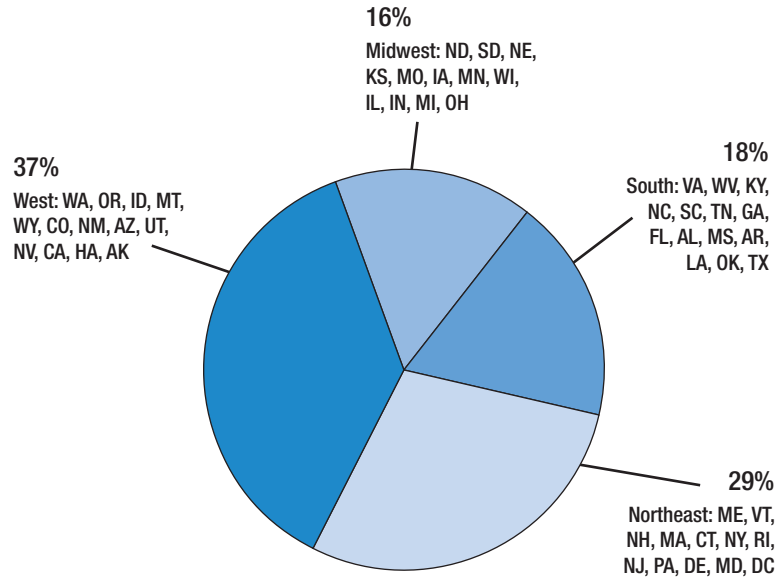
* Multiple selections allowed

The survey respondents are well distributed geographically (Fig. 3). Most respondents are from the West (37%), a function of the large population of California and the informal “robotics cluster” found in the San Francisco/Silicon Valley area, as well as the number of defense contractors in Southern California. The Northeast, which includes the formalized Boston and Pittsburgh robotics clusters—the Massachusetts Robotics Cluster and the Technology Collaborative, respectively—account for 29% of the respondent base, followed by the South (18%) and the Midwest (16%).

Most respondents hail from geographies with one or more robotics clusters.

FEATURE: THE ROBOTICS WORKFORCE

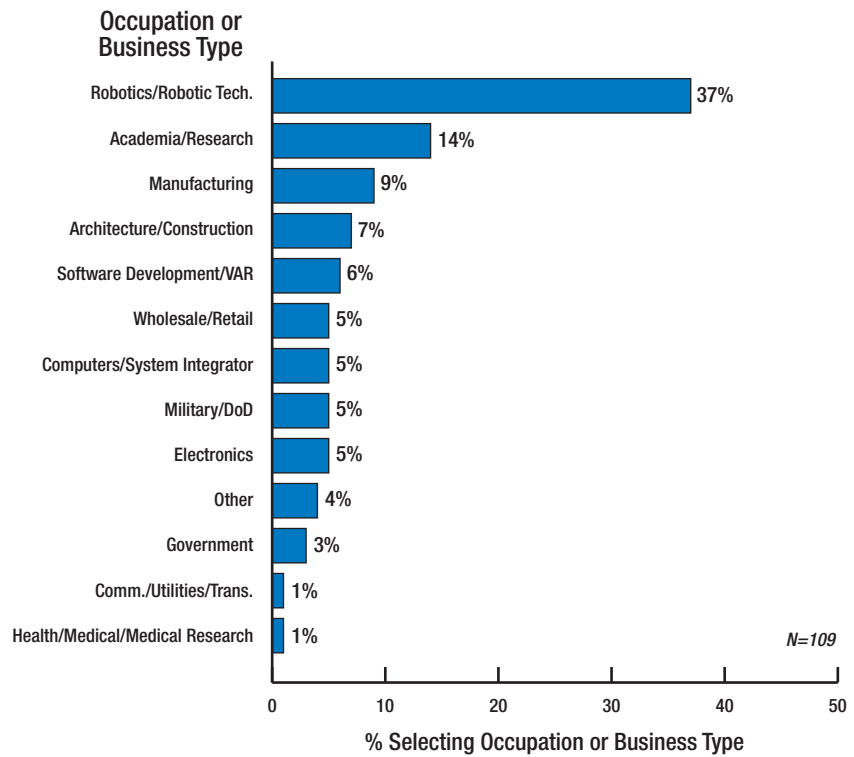
FIGURE 3. If your company is based in the U.S., in what geographic region does your home office reside?



Also Australia, Canada, Ecuador, France, India, Israel, Japan, Mexico, New Zealand, Philippines, Spain, Sweden, Taiwan, UK

N=112

FIGURE 4. What is your occupation or primary type of business?



N=109

Survey respondents represent a wide variety of vertical market segments and business types (Fig. 4). The sample was limited to individuals who develop, sell, or use robotic technology, so it is no surprise that the majority of the respondent base cite “robotics/robotic technology” as their primary business (37%). The remaining respondents are well distributed among all the other industries, with no other group representing more than 14% of the overall survey sample.

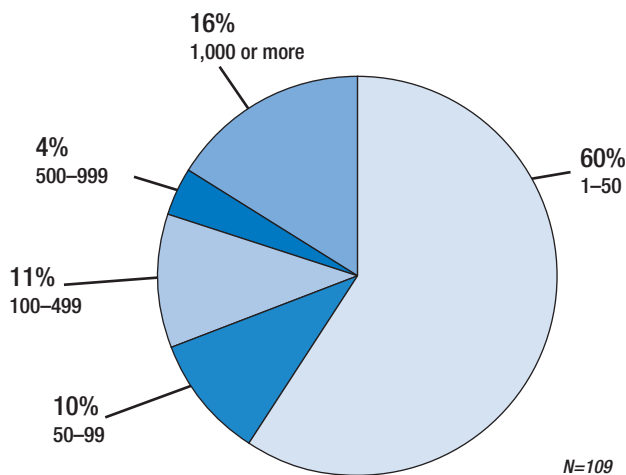
Most survey respondents work for small companies.

Small Companies Predominate

Survey respondents come from a wide range of companies, from small start-ups and growing midsize companies, to the largest global corporations. As expected from a nascent industry like robotics, most survey respondents work for small companies. For example, 60% work for companies with less than 50 employees (Fig. 5). The revenue figures for the companies have a similar profile (Fig. 6). More than 50% of the respondents work for companies that had \$10 million or less in revenues for their last fiscal year.

A second feature of the employee figures provided in Figure 5, which is a reflection of the robotics industry at large, is that the second largest group of respondents comes from large companies. If Figure 5 were graphed as a histogram with number of employees given as the Y axis, the graph would be characterized by a bimodal distribution, although the peak for companies having 1–50 employees would be much higher than for companies with more than 1,000 employees. This distribution, which can be generated using variables other than employee number, is characteristic of the robotics industry and differs from other classes of tech-centric industries such as the information technology (IT) market.

FIGURE 5. What is the total number of full-time employees at your company?

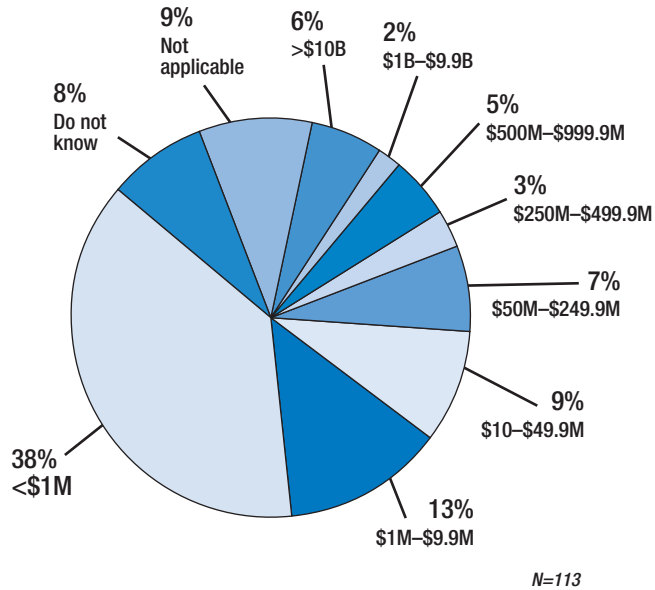


Small companies run the gamut as to their type of business, while the large companies are limited to software development, reselling, manufacturing, defense contracting, and producing computer hardware and electronics.

None of the business types or vertical market segments in Figure 4 are overrepresented among the small businesses. There is an even distribution of all business types amid the smallest companies in the survey. This is not the case for the largest companies in the survey, those with 1,000-plus employees. Again, no single business type or market segment dominates the large companies. Instead, they are evenly distributed among, and largely limited to, software developers/VARs, manufacturers, producers of computer hardware, electronics firms, and defense contractors.

FEATURE: THE ROBOTICS WORKFORCE

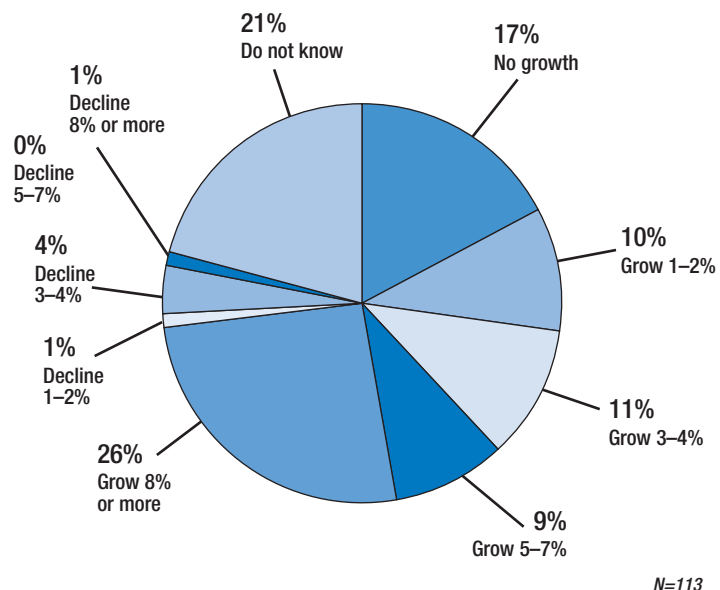
FIGURE 6. What was your company's gross revenue for fiscal year 2008?



Bullish on Growth

The majority of survey respondents expect that their companies will grow in revenue in FY2010. Fifty-six percent of respondents expect their companies' revenues to increase in 2010 compared with 6% who expect revenues to decline (Fig. 7). Seventeen percent believe that revenues will be flat in 2010, while 21% have no opinion or work for nonprofit organizations. Not only do most respondents expect growth, they expect strong growth. Of the 56% of respondents who anticipate growth in 2010, 35% expect revenue growth of 5% or more, with 26% expecting 8% and higher growth.

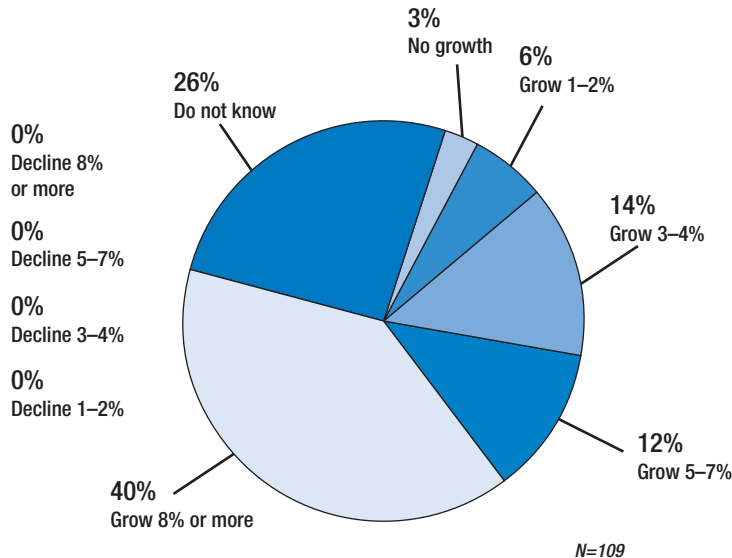
FIGURE 7. How much is your company estimated to grow in revenue in FY2010?



Respondents expect strong revenue growth for their companies in 2010, and are even more bullish in their outlooks for the next five years.

Survey respondents are even more bullish in their revenue expectations for the next five years. Not a single respondent indicates that his or her company's revenues will decline in five years' time, and only 3% expect "no growth." Seventy-two percent expect an increase in company revenue, with 52% anticipating growth greater than 5%.

FIGURE 8. What is your company's estimated annual growth in revenue over the next five years?



Current and Future Patterns in Hiring

Strong for R&D and Engineering Positions

Survey respondents were queried as to the positions for which their companies are currently hiring. Results show employment related to engineering and research and development dominate over other types of nontechnical, business-oriented positions, as well as technical disciplines unrelated to design and development (Fig. 9). The exception is sales and marketing. More than 40% of the respondents indicate that their companies are actively hiring for three positions: R&D (51%), software engineering (42%), and mechanical engineering (40%). This stands in stark contrast to nonresearch and non-engineering positions such as post-sales installation (6%), business management (12%), QA (14%), operations (14%), project management (17%), and so on.

The predominance of technical/engineering hires is backed both by survey results and a random search of job postings at robotics companies. Intuitively, this also makes sense. To illustrate, similar hiring profiles can be found in other tech-heavy vertical market segments, and especially so in young industries or those characterized by a preponderance of small companies. "Robotics" is a technical industry (as opposed to a service industry, for example), that is both relatively young and dominated by smaller companies.

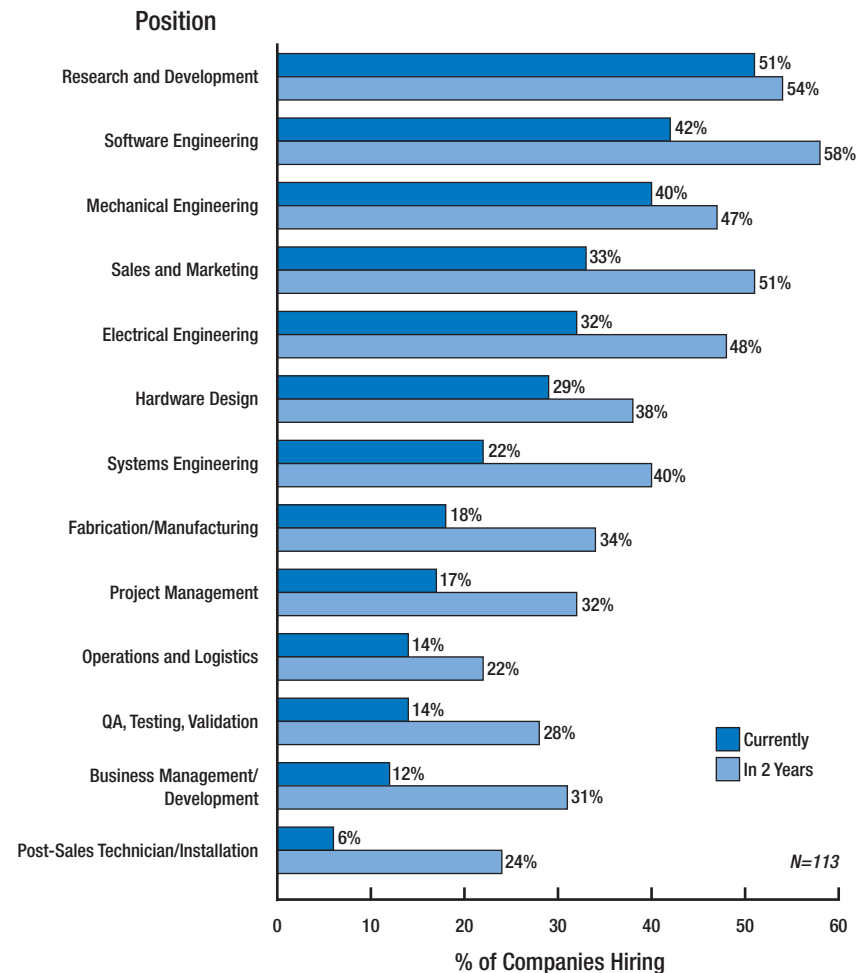
A similar hiring profile is produced when survey respondents were questioned regarding hiring plans two years hence. Again, hiring for engineering and research-related positions is expected to dominate. Also, respondents expect hiring to increase

Companies are currently hiring for R&D and engineering positions, predominantly, and this is expected to be the situation again two years hence.

FEATURE: THE ROBOTICS WORKFORCE

for all classes of positions overall compared with 2009, with the exception of research and development, which is expected to remain relatively flat. These results are in keeping with survey respondents' positive outlook for revenue growth (Fig. 8).

FIGURE 9. For which of the following positions is your company currently hiring? In two years?



Over the next two years, a substantial percentage of companies will also be hiring for non-engineering positions.

Non-Engineering Hires Follow

While engineering-related hires are expected to be strong over the next two years based on survey results, some companies will also begin increasing their number of non-engineering hires. For example, 51% of companies expect to be hiring for positions in sales and marketing in two years, compared with 33% currently. Business management/development (12%, increasing to 31% of companies in two years) and post-sales technician/installation (6% to 24% of companies in two years) provide additional examples.

The employment trends are clear: Hires are following the traditional product development lifecycle. Research and development precedes engineering, which in turn is followed by manufacturing/fabrication and then marketing and sales. The survey sample, which largely comprises representatives from smaller robotics companies (Figs. 4, 5,

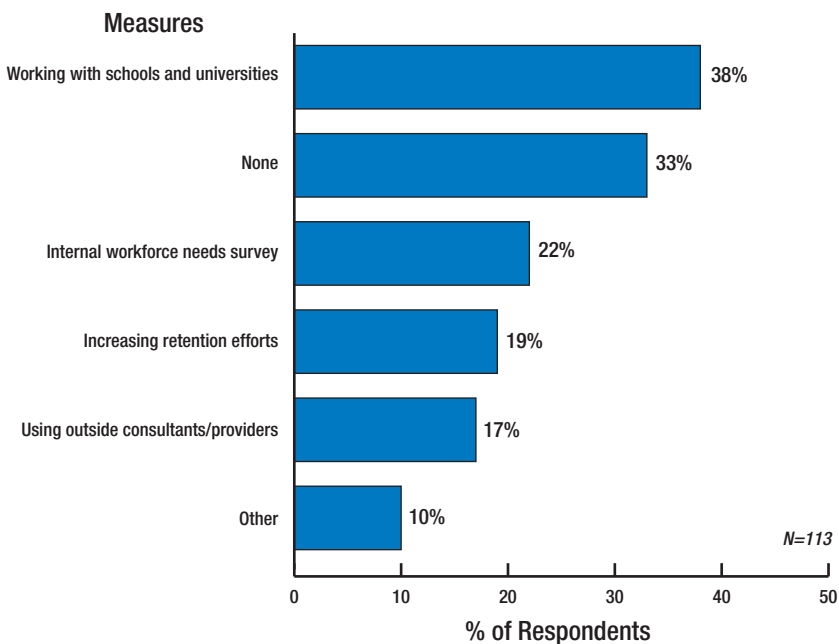
and 6), mirrors the market at large: small, emerging, and technically oriented companies expecting strong growth. They are in the early phases of product development (R&D and engineering), and expect to hire for sales and other non-engineering positions as products become market ready.

Workforce Development Initiatives

Little Done to Address Workforce Needs

Overall, surveyed companies do relatively little to address their robotics workforce needs. Thirty-eight percent of companies work directly with schools and universities, but this figure is nearly equal to the percentage of companies that do nothing at all (33%). Twenty-two percent perform internal needs surveys, 19% are increasing their retention efforts, and 17% are using outside consultants (Fig. 10).

FIGURE 10. What measures is your business taking at this time to address your robotics workforce needs?



* Multiple selections allowed

The figures described above are low, but not alarmingly so, since survey respondents were allowed to make multiple selections to detail their company's workforce development efforts. However, the average number of initiatives per company is only 1.2. That is, most companies limit themselves to only one initiative. This, of course, could be a reflection of the large percentage of small companies that make up the sample, but that proves not to be the case. When the number of workforce development initiatives per company is averaged for those companies having in excess of 1,000 employees, the figure comes to 1.38. This is larger than the average of 1.2 for the survey sample as a whole, but not decidedly so.

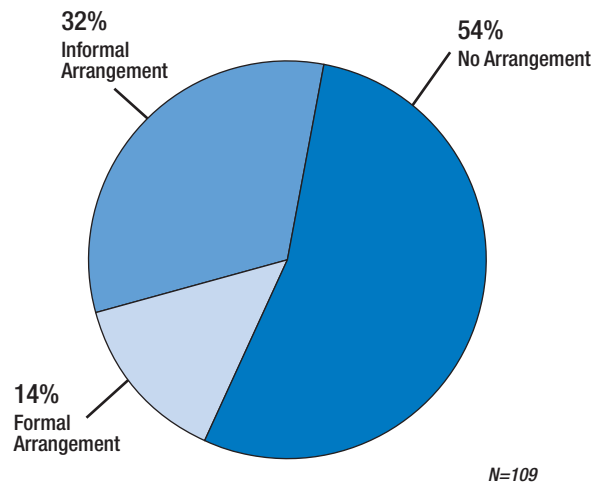
The surveyed companies, both large and small, do relatively little to address their robotics workforce needs.

FEATURE: THE ROBOTICS WORKFORCE

Internships and Co-ops

The placement of students in internship positions often leads to hiring, particularly if companies have established formal relationships with specific educational institutions. Yet as noted above, only 38% of survey respondents indicate that their company works with schools and universities (Fig. 10). In addition, when survey respondents were queried as to the status of formal arrangements their companies have with educational institutions, results show that more than 50% have no agreement, while an additional 32% have only an informal relationship (Fig. 11).

FIGURE 11. What arrangements do you have with educational institutions to hire students for robotics jobs?



Only 14% of respondent companies have a formal arrangement with educational institutions. Typically, these relationships take the form of internships or co-ops. It is important to note that in many cases interns or co-op students are hired after graduation by the companies in which they have worked while in school. In fact, 67% of respondent companies hire students that intern with them (Fig. 12), with 27% of respondent companies hiring interns “often” for full-time positions upon graduation (Fig. 13).

FIGURE 12. Does your company hire interns or co-op students?

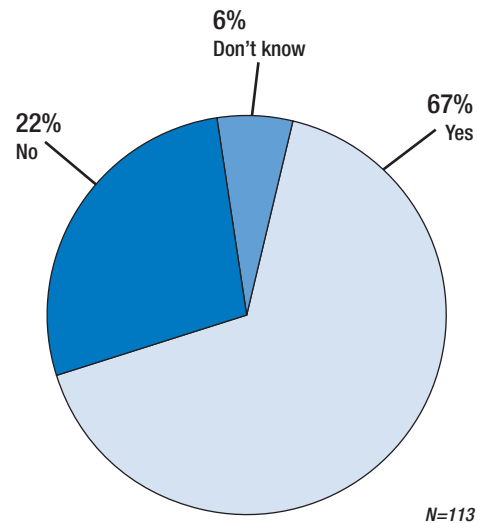
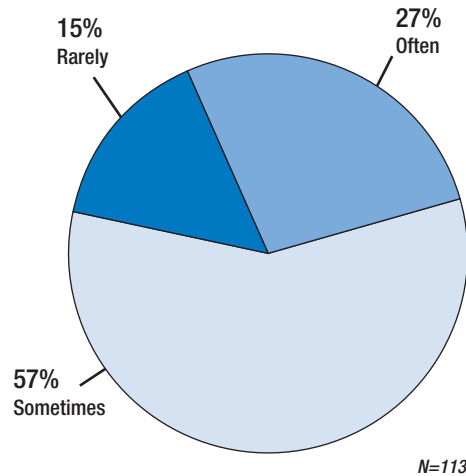


FIGURE 13. Do you hire these students into a full-time position upon graduation?



Taken in total, the current situation appears to be one in which the surveyed companies do hire interns and co-op students, and nearly one-third of those companies hire them “often” following graduation. Another 57% hire interns “sometimes.” Yet only 14% of respondent companies have a formal relationship with the educational institutions that supply the interns, a relationship that would facilitate internships and, presumably, benefit both parties.

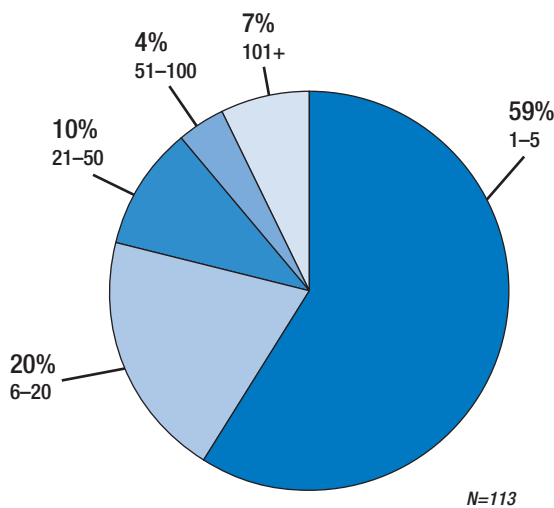
Companies hire interns “often” for full-time positions upon graduation, but few have formal relationships with the educational institutions that could supply the interns.

Current and Future Robotics Workforce Needs

Hiring, But in Small Numbers

Virtually all survey respondents indicate that their companies will be hiring over the next year. As would be expected given the small size of most respondent companies, as well as the current economic situation, the majority of companies will be hiring only a small number of individuals (Fig. 14).

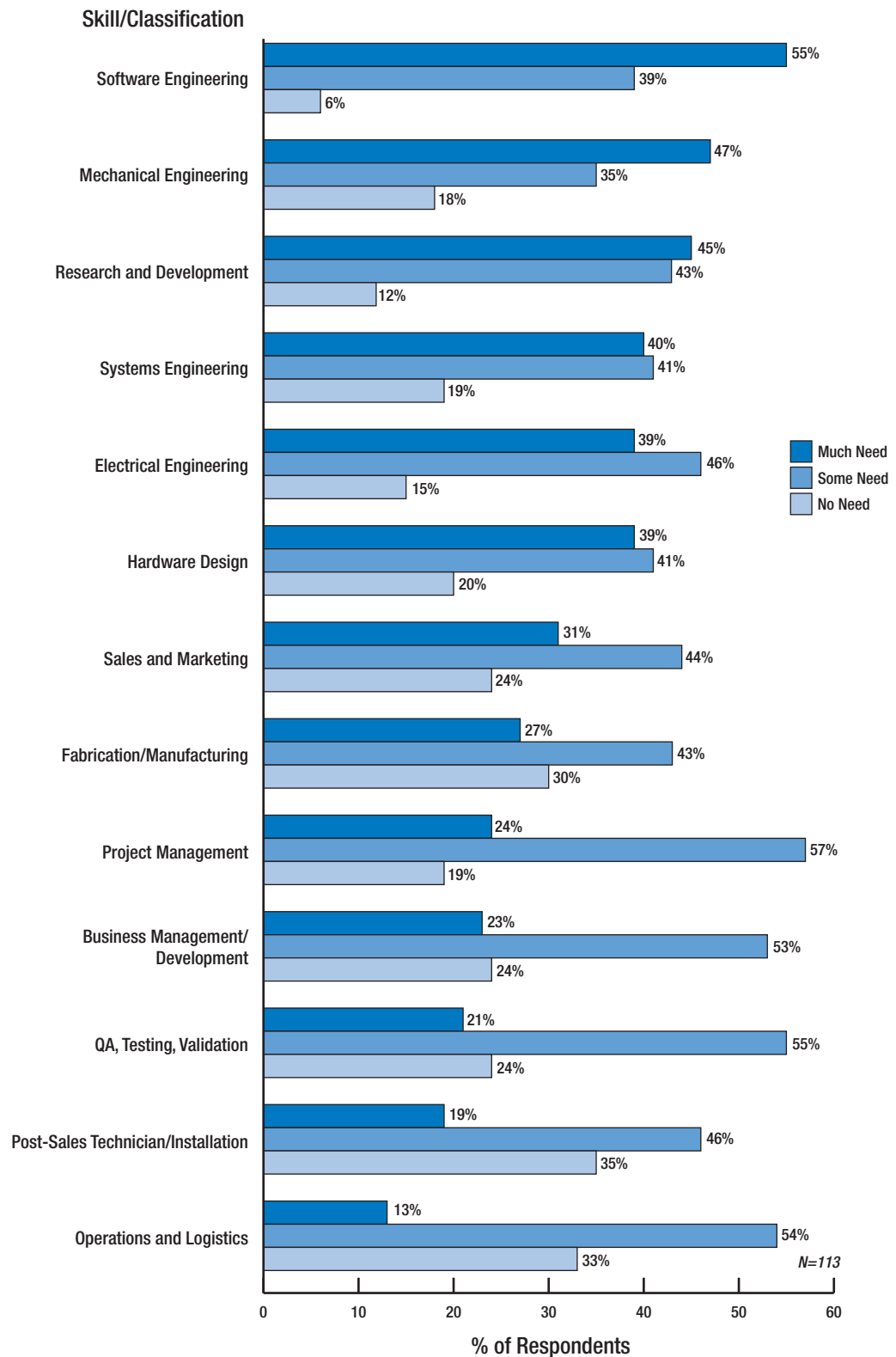
FIGURE 14. Please estimate the number of new employees you think your company will hire within the next year.



Companies will be hiring over the next year. The overall hires will be few, but sizable in relative terms.

FEATURE: THE ROBOTICS WORKFORCE

FIGURE 15. Please rank your company's *need* for qualified individuals with the following skills/job classification.



For most companies, at this time, there is an immediate need for individuals with research, development, and engineering expertise.

Approximately 60% of the respondents note that their companies will be hiring only 1–5 employees over the next year, with an additional 20% believing that 6–20 individuals will be hired at their companies. While these figures appear small given the size of the majority of the companies represented by the survey, in relative terms they represent a sizable increase in employees. Again, the hiring estimates are in concordance with the respondents' belief that their companies will be increasing their revenues over the next two years (Figs. 7 and 8).

Engineering Trumps Others

The companies represented by survey respondents are currently hiring for research and development positions, along with other engineering disciplines, in percentages much higher than for non-engineering positions (Fig. 9). This corresponds strongly with the data presented in Figure 15, when survey respondents were queried as to their companies' need for individuals possessing various classes of technical and nontechnical skills.

It is clear from the results in Figure 15 that companies are most in need of individuals having advanced technical skills. However, not all technical proficiencies are viewed as having equal worth, at least not over the next year. Fabrication/manufacturing and QA and testing, for example, are technical disciplines, but in terms of “need” they are viewed as less critical than R&D expertise and engineering competence in areas such as software engineering, mechanical engineering, and so on. Speaking broadly, engineering proficiency is more highly valued than other types of technical and nontechnical skill sets at this time.

Robotics development differs from other types of engineering disciplines in that it is truly interdisciplinary, involving a combination of software engineering, mechanical engineering, and electrical engineering. The high percentage of respondents indicating that there is “much need” for these three classes of engineering skills speaks to their central role in robotics development. Systems engineering, a branch of engineering focused on the design and development of complex, highly integrated operational systems, also plays a major role—perhaps even a dominant role—in robotics technology development. The large percentage of respondents indicating that systems engineers are “much needed” in their organizations reflect this fact.

The central role that software, hardware, mechanical, and systems engineering play in robotics is one reason for the high marks these disciplines receive, but not the only reason. As noted earlier (see “Non-Engineering Hires Follow”), the majority of surveyed companies are small in size, presumably relatively young, and are hiring in accordance with traditional product development lifecycles. For these companies, there is an immediate need for individuals with research, development, and engineering expertise.

Equal Difficulty Hiring

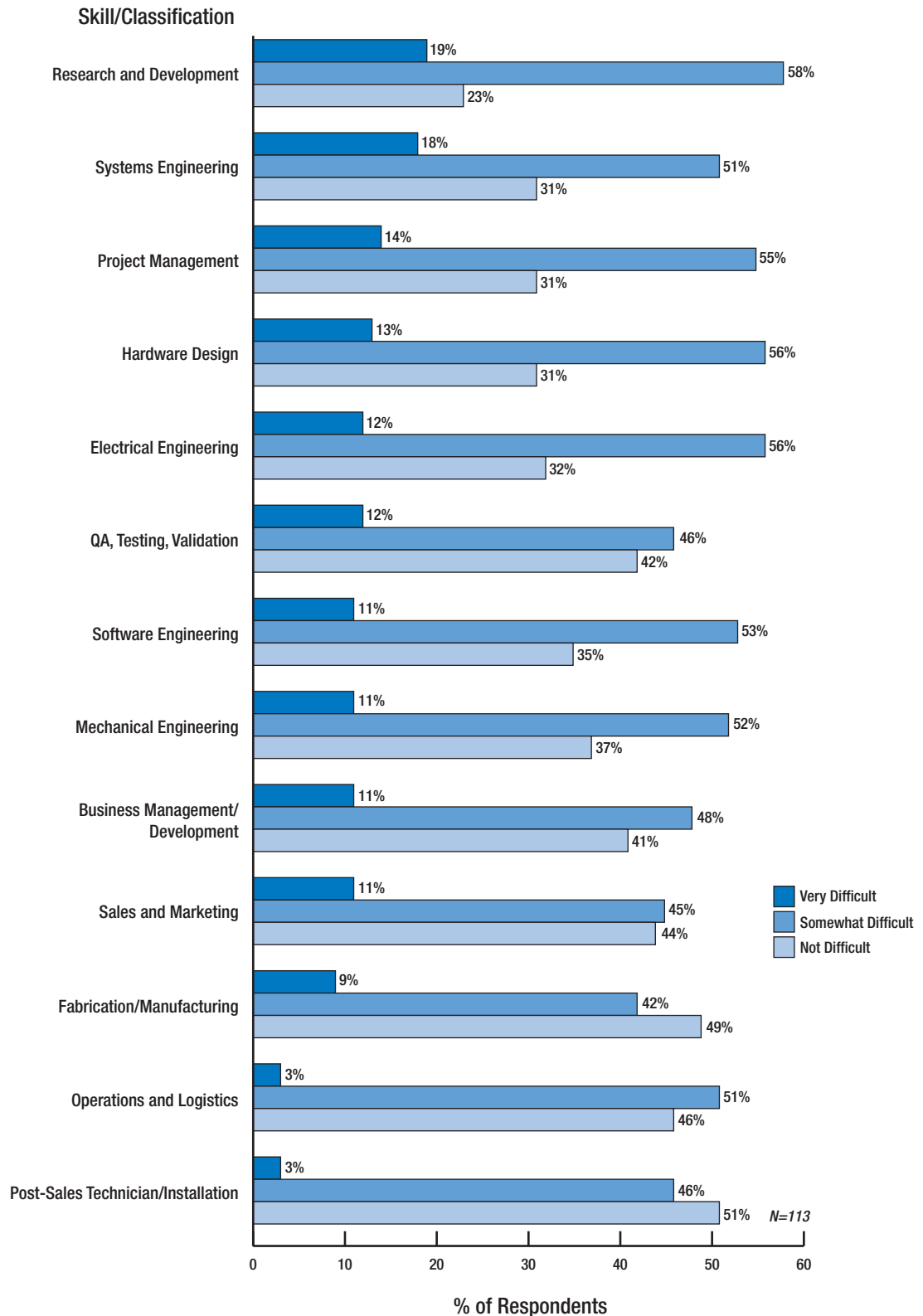
According to the survey respondents, it appears that their companies do not have undue difficulty hiring qualified individuals (Fig. 16). Overall, the percentage of respondents whose companies are having “some difficulties” or “no difficulties” hiring qualified personnel dwarfs the percentage of respondents indicating they are having a “very difficult” time finding suitably skilled individuals. Moreover, for the key disciplines of mechanical engineering, software engineering, and electrical engineering, only a relatively small percentage of respondents indicate that their companies have

At this time, competence in various engineering disciplines is more highly valued than other types of technical and nontechnical skill sets.

The robotics industry does not appear to be facing a workforce shortage. Companies are not having undue difficulty hiring qualified individuals.

FEATURE: THE ROBOTICS WORKFORCE

FIGURE 16. Please rank your company's difficulty *hiring* qualified individuals with the following skills/job classification.



found hiring for these positions “very difficult.” The “very difficult” percentages for R&D and systems engineering were the highest, but only modestly so compared with the other classes of skill sets.

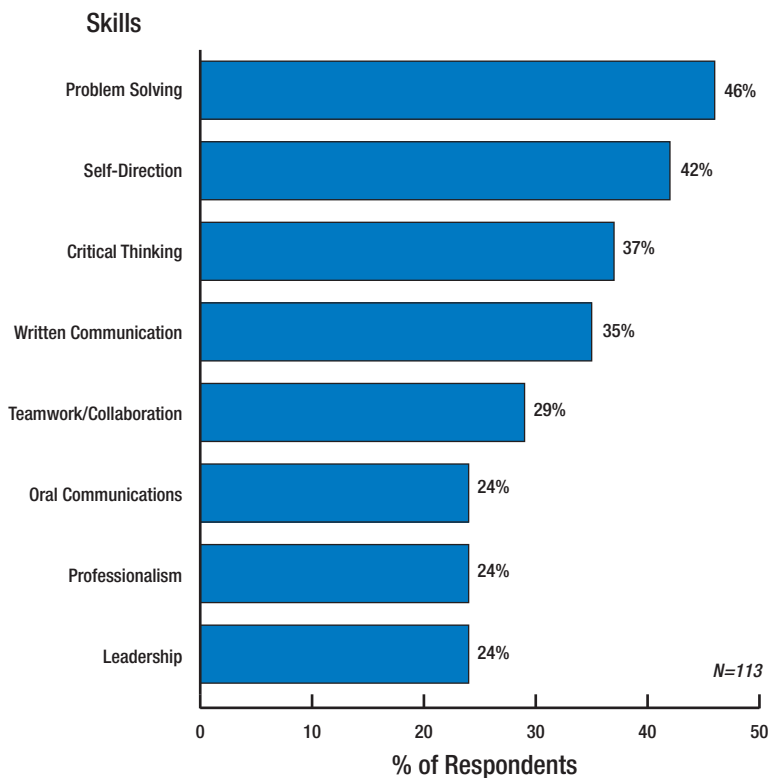
It should be noted that the percentages of respondents indicating that they have “some difficulty” hiring qualified individuals is basically the same across all job classifications. The same basically holds for the percentage of respondents who indicate finding qualified hires as “very difficult” and “not difficult.” That is, in broad terms, the relative difficulty in hiring qualified individuals is basically the same across all job classifications. No skill or discipline is a strong outlier. For educational institutions and training companies, this means there is no single skill gap that presents an easy opportunity for additional training and educational efforts. Instead, these groups should focus on areas in which companies have indicated they have “much need” for qualified individuals (Fig. 15).

Applied Skills

As noted above, most respondent companies are hiring predominantly for R&D and engineering positions (Fig. 9). It is well known that the most successful (and most coveted) engineers also exhibit a number of other skills in addition to their technical expertise. When queried as to these “applied skills,” survey respondents indicate that self-directed problem solving and critical thinking are the most valued attributes (Fig. 17).

Respondents indicate that companies are having equal difficulty (or lack thereof) filling positions across all disciplines or skill sets. To differentiate themselves and serve the needs of the marketplace, educational institutions and training companies should focus on providing training in the disciplines in which the market has indicated they have “much need.”

FIGURE 17. What do recent new engineering and technology-related hires lack for applied skills that are most important to your company? (Choose only three.)



FEATURE: THE ROBOTICS WORKFORCE

FIGURE 18. Does your company hire new graduates fresh out of school?

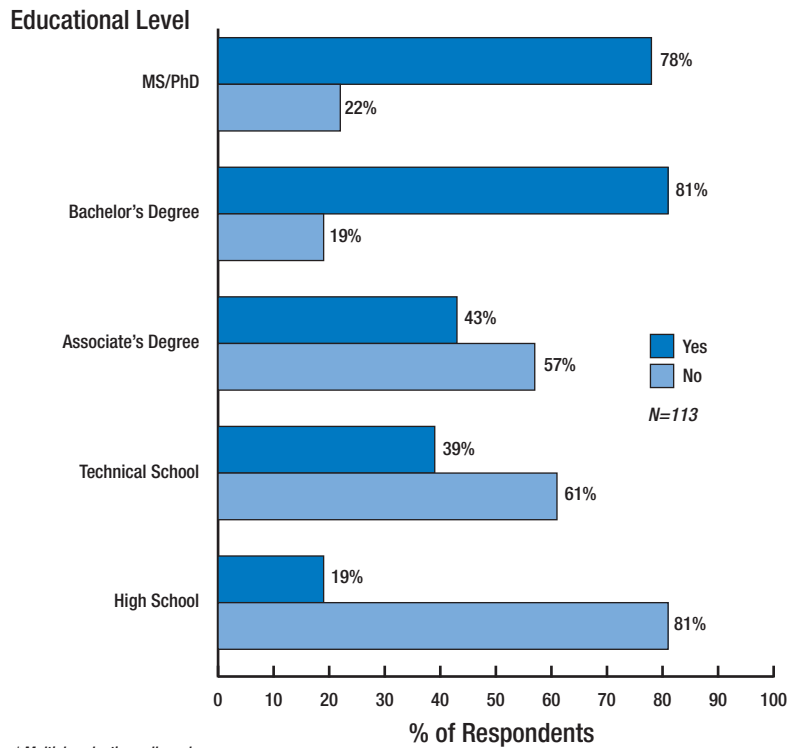
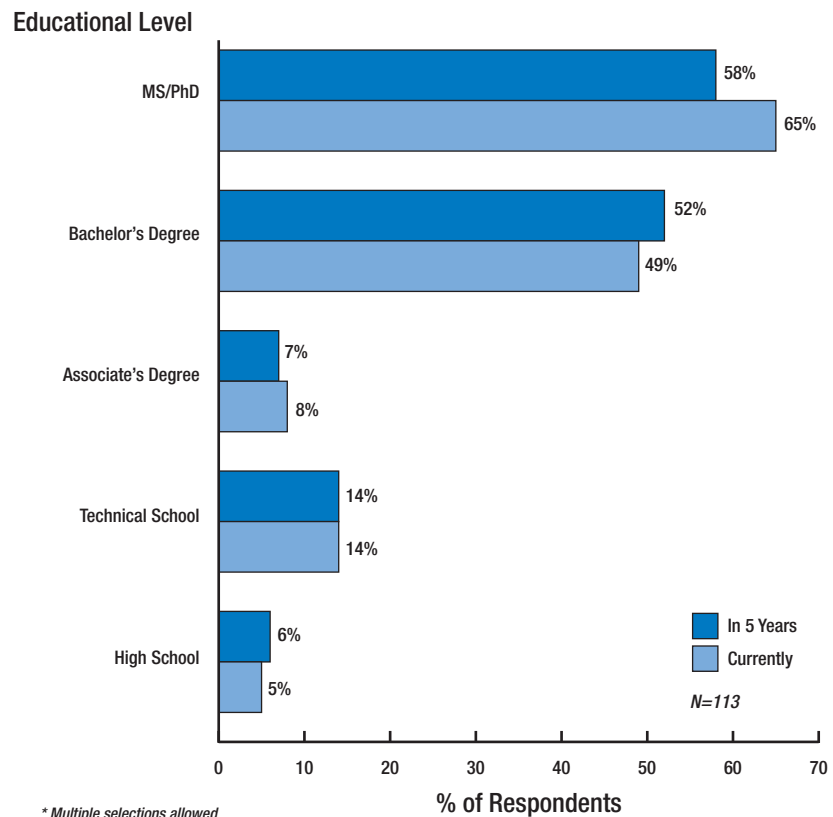


FIGURE 19. At which educational levels does your company currently have difficulty recruiting qualified employees for engineering and technology related positions? In five years?



Educational Levels and New Hires

Education levels largely determine whether respondent companies hire graduates fresh out of school. Those applicants with higher levels of education have a greater chance of being hired immediately following graduation (Fig. 18). The changeover occurs at the level of bachelor degree.

A pattern similar to that found in Figure 18 occurs when the following questions were asked: “At which educational levels does your company currently have difficulty recruiting qualified employees for engineering and technology-related positions? At which educational levels do you expect your company to have difficulty recruiting qualified employees in two years?” The results, given in Figure 19, indicate that the survey respondents find little difficulty hiring those with high school, technical school, and associate’s degrees for technical positions. Respondent companies have greater difficulty hiring those with bachelor’s degrees and above (more than 50% of companies struggle) and the problem shows no sign of abatement over the next two years.

Training and Retention Strategies

Formal Training

It is well documented that employee training, beyond introductory instruction or orientation, provides a number of benefits both to employees and employers. These include, but are not limited to:

- Increased employee motivation
- Increased job satisfaction and morale among employees
- Increased capacity to adopt new technologies and methods
- Increased efficiencies in processes
- Increased innovation in methods, strategies, and products
- Reduced employee turnover

Employee training is commonplace, but even more so for technology-centric businesses such as robotics in which advances come quickly and are unending. Respondent companies do not provide employee training to any appreciable amount. Approximately 50% of the respondents report that 25% or fewer of their employees are provided with training (Fig. 20). The remaining companies are basically evenly distributed with their support for training. The relatively low level of training exhibited by respondent companies is not a reflection of company size. Large companies (those with more than 1,000 employees) do offer additional training, but not significantly more.

Technical Training

Survey respondents were queried as to the value of training for a number of technical disciplines. Results show all choices are given a similar ranking for “nice to have” (Fig. 21). Approximately one-half of the respondents rate all of the subjects a middling “nice to have,” with percentages ranging from 40% to 59%. However, the remaining 50% (again, speaking very generally) do not believe that all disciplines are of equal value, with training for some disciplines considered extremely valuable while others are much less so. For example, training in sensors and sensor fusion is considered “extremely valuable” by 55% of the respondents, with only 5% categorizing instruction efforts in this category as “irrelevant.”

Resources

Association for Career and Technical Education
www.acteonline.org

Computing Research Association
www.cra.org

International Technology Education Association
www.iteaconnect.org

National Science Foundation
www.nsf.gov

Technology Student Association
www.tsaweb.org

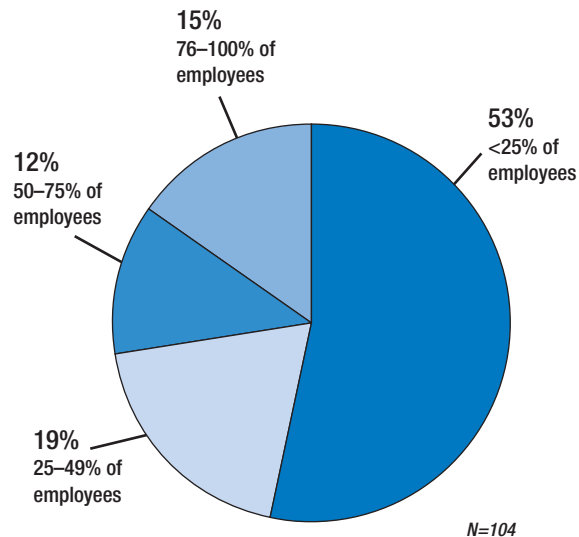
U.S. Department of Education
www.ed.gov/index.jhtml

U.S. Department of Labor
www.dol.gov

FEATURE: THE ROBOTICS WORKFORCE

FIGURE 20. On average, what percentage of your employees receive formal training provided through the company each year?

Subjects common to multiple classes of robots, as well as critical to robotics systems development, are the most highly valued for technical training.



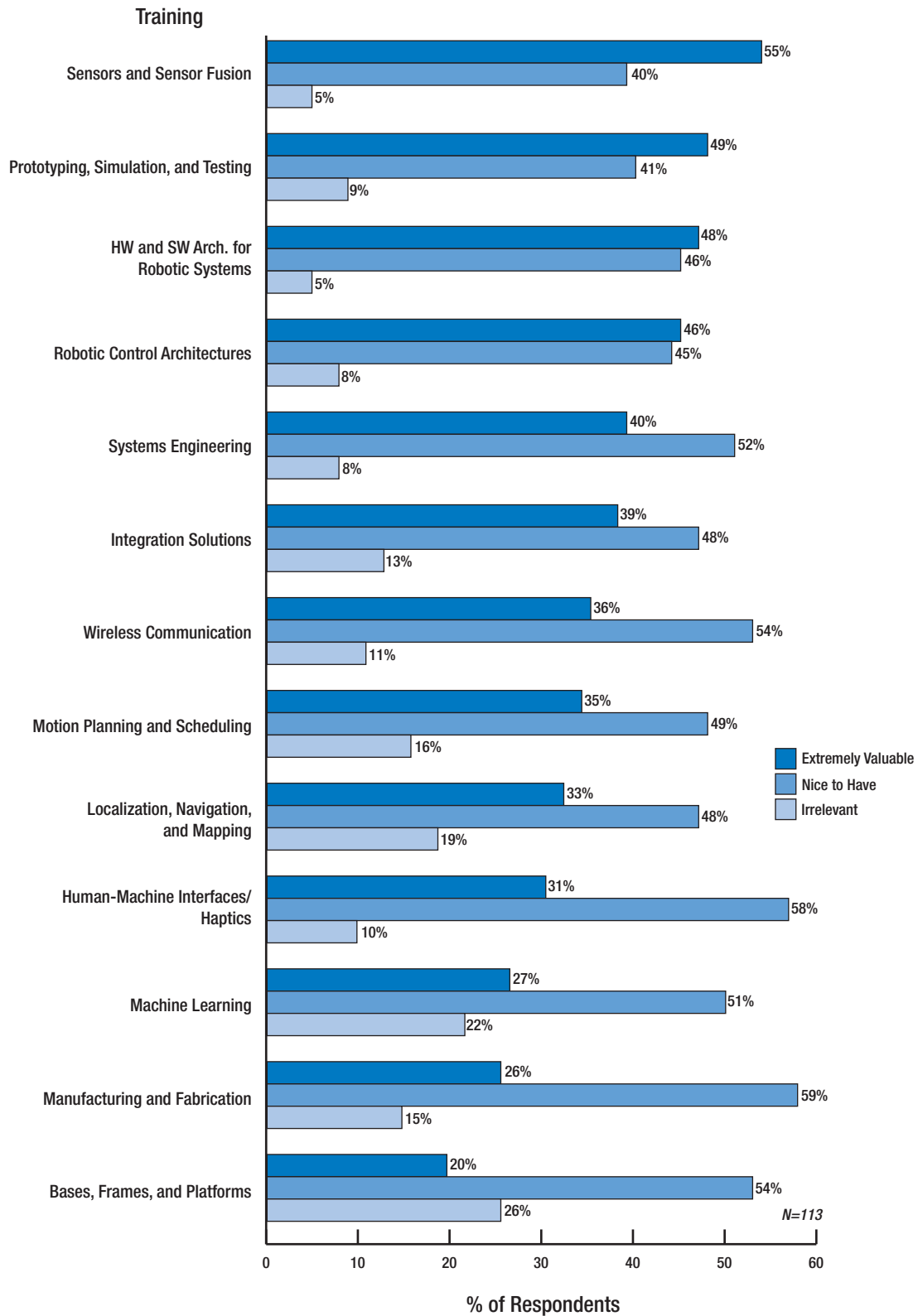
The ranking of subjects for training provides insights into the needs of the robotics marketplace and the relative value of specific skills and education.

When the percentage of technical training disciplines rated “extremely valuable” is considered separately, it becomes clear that some disciplines are deemed much more critical than others. More than twice as many respondents, for example, rate sensors and sensor fusion as “extremely valuable” compared with bases, frames, and platforms. At first glance, there appears to be no pattern in the graphed results. However, upon further examination, topics common to all classes of robots—mobile, industrial, medical, defense, and so on—are considered of greater value than more rarefied subjects. For example, sensing, simulation, hardware, and software architectures are applicable to all manner of robotics systems, while other subjects and functions such as human-machine interfaces and machine learning are much less common to robotics systems. Subjects of high complexity or those that are critical to the development of robotics systems—sensor fusion and systems engineering provide examples—also score well on the value scale.

Technical training must be geared to specific companies, particularly if those companies are small and limited in their range of products. Most respondent companies are small (Figs. 5 and 6), so the responses captured in Figure 21 must reflect the position of smaller companies in general. For larger companies, which are often smaller, multidisciplinary entities, Figure 21 also provides insights into the relative value of a number of technical training topics. This information, therefore, is of value to:

- Educational institutions developing technical training curricula
- Robotics companies providing their own internal training
- Third-party solution providers offering additional value-add training services

FIGURE 21. How valuable would easy access to technical training in the following topic areas be to your company?



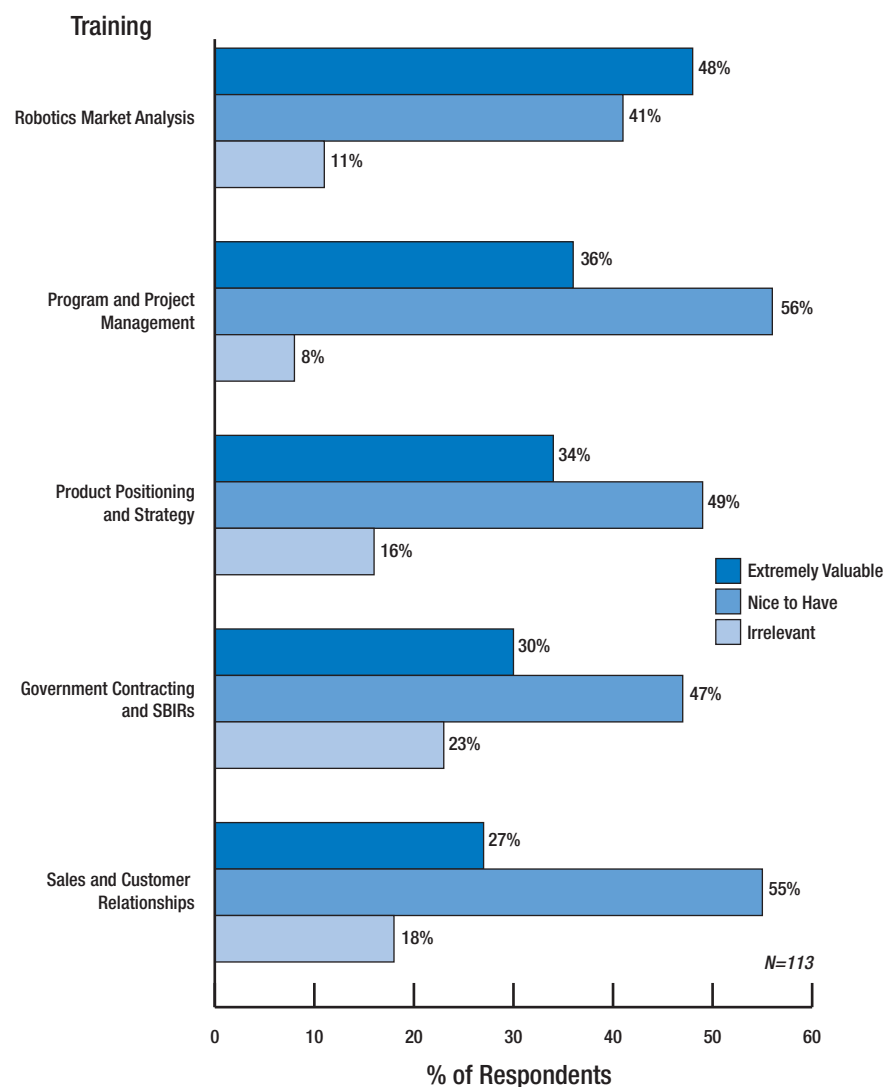
FEATURE: THE ROBOTICS WORKFORCE


The information captured in Figure 21 also provides insights into the relative value of specific skill sets in the job market. Where companies need training, they also require expertise. Therefore, the relative value of a given training topic area is an indication of the relative worth of that particular skill set on the open market. Again, those individuals who can solve complex problems that have broad applicability will be highly sought after.

Nontechnical Training

Survey results for nontechnical training provide an unusual finding. Training directly related to sales and contract generation—government contracting and SBIRs and sales and customer relationships—score worse than other types of nontechnical training (Fig. 22). For example, when the percentages of respondents who indicate that a specific class of training is “extremely valuable” or “nice to have,” sales and customer relationships (82%) and government contracting and SBIRs (77%) are behind product position and strategy (83%), robotics market analysis (89%), and program and project management (92%).

FIGURE 22. How valuable would easy access to nontechnical training in the following topic areas be to your company?



If only the percentage of respondents selecting “extremely valuable” is considered, the trend is even clearer. Robotics market analysis scores 18 points higher than government contracting and SBIRs, and almost twice as high as sales and customer relationships. This would seem counterintuitive, as revenue generation due to direct sales or government contracts—a major source of funding for robotics in the United States (R&D and commercialization)—is the foundation of any successful business. However, training for sales and government contracting is fairly common, and sources of such training are widely available. The same cannot be said of robotics market analysis or positioning strategies directed specifically at robotics. In addition, market analysis and product positioning analysis traditionally take place before product design and development. 

Sales and government contracting instruction are viewed as less valuable than training in robotics market analysis, program management, and product positioning, a reflection of the latter subjects’ rarity and role in initial development efforts.

The Bottom Line

Robotics Business Review surveyed 117 individuals whose companies develop, resell, or use robots and robotic technology to produce a profile of their current and future labor force, hiring trends, and training practices. The survey found:

- Respondents expect strong revenue growth for their companies in 2010, and are even more bullish in their outlook for the next five years.
- Companies are currently hiring for R&D and engineering positions, predominantly, and this is expected to be the situation again two years hence.
- Over the next two years, a substantial percentage of companies will also be hiring for non-engineering positions.
- The surveyed companies, both large and small, do relatively little to address their robotics workforce needs.
- Companies hire interns “often” for full-time positions upon graduation, but few of those companies have formal relationships with the educational institutions that could supply the interns.
- Companies will be hiring over the next year. The overall hires will be few but sizable in relative terms.
- For most companies, there is an immediate need for individuals with research, development, and engineering expertise.
- At this time, competence in various engineering disciplines—mechanical, software, electrical, and systems engineering—is more highly valued than other types of technical and nontechnical skill sets.
- The robotics industry does not appear to be facing a workforce shortage. Companies are not having undue difficulty hiring qualified individuals.
- Subjects common to multiple classes of robots, as well as critical to robotics systems development, are the most highly valued for technical training.
- The ranking of subjects for training provides insights into the needs of the robotics marketplace and the relative value of specific skills and education.
- Sales and government contracting instruction are viewed as less valuable than training in robotics market analysis, program management, and product positioning, a reflection of the latter subjects’ rarity and role in initial development efforts.