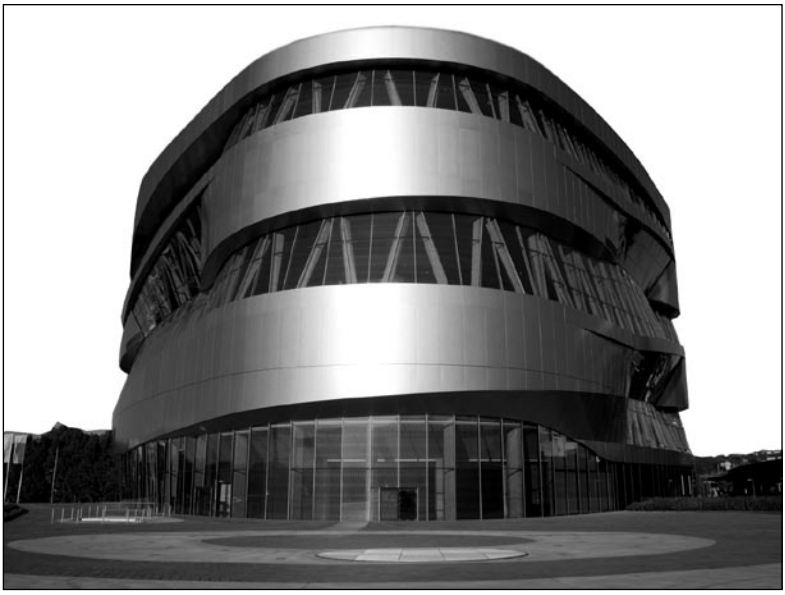

4. Crafting an Industry Career

Tooling Up: Three Categories of Rules

From: dx.doi.org/10.1126/science.caredit.a0700184

By David G. Jensen— First published December 21, 2007

Many of my columns here describe difficulties people experience when they discover how different life is in industry than in academia. Each sector has its own rulebook; new graduates often feel they've been thrown into the fire when they make the change to a company employer. The conventions at work in industry aren't taught in college.

Michael Zigmond of the Department of Neuroscience at the University of Pittsburgh in Pennsylvania runs the highly regarded "Survival Skills and Ethics Program" seminars held each year in Aspen, Colorado. He told me recently that he believes there are three categories of rules that we come across in our work lives. The rules themselves may differ, but Zigmond's categories hold true no matter where you work.

"First off, there are rules that are true and which deserve that distinction. In academia, one example of this category would be the rule that 'Research equals experiments plus publications,'" Zigmond explained to his class in Aspen. "Another type of rule is one which is true, but which shouldn't be. Some examples are 'Always have preliminary data for proposals,' or 'Always do hypothesis-driven research.' Lastly, some rules are *not* true but *should* be. 'Good teaching is essential to promotion' is an example that I point to from

Those who learn networking early and practice it often are among the successful people in science. Years from now, you'll have new opportunities to thank the contacts you make today, assuming, of course, that you make those contacts.

the world of academia, where countless students have wondered how some people have moved up the ranks."

Sometimes a rule from the university clashes with a rule from industry. Consider Michael's first example: *Research = Experiments + Publications*. Would you land a job at a top-tier biotech company if you went to an interview espousing that as a guiding rule for your career? No way!

In industry it looks like this: *Research = Experiments + Products*.

The single most important evidence of productive research in industry is the development of research applications that can return value on shareholders' investments. Most of the time this means products. Although at some point in a well-run research organization you will be able to publish your work, it only ever happens after the company has protected its intellectual property.

Sometimes in this column I point out how a rule *really* works or make you aware of a rule that you may not have known about. That's my job here. Sometimes I try to help you learn to work within the rules. And sometimes my columns tell you how to work around the rules.

This time I provide some examples of rules from the biotechnology industry indexed into Dr. Zigmond's three categories. Studying rules from the three categories will help you come away with a better understanding of how company policy and politics impact life in a company and why, on occasion, it is better to circumvent rules than to follow them.

Rules That Are True and Which Should Be

Good communication skills are essential for success in any job. Read the job ads and you'll notice that good communication skills are mentioned in more than half. Insiders know this is more than standard HR-speak. Employers can't help but be impressed with good communicators, because anyone who runs a job ad knows these people are few and far between. If someone asked me what the No. 1 skill is that impacts hiring decisions, it would be this one. And communication skills are critical for moving up the ladder once you have that position.

Networking is a great way to find a job. Ads, job fairs, the Internet, headhunters, networking—don't miss any of these when you go looking for a new position. But stay particularly close to your networking contacts. Networking is a life skill and not just a job-search tool. Like communication skills, networking can help you get a job—and then help you perform well once you've got it. Those who learn it early and practice it often are among the successful people in science. Years from now, you'll have new opportunities to thank the contacts you make today, assuming, of course, that you make those contacts.

Industry success requires teamwork and interdependence. Independence rules in academia. Collaboration and teamwork get a lot of lip service, even in academia. And in fact, even there some value it and do it well. Yet a lab of your own, trainees assisting you, your own grants—all these aspects of independence are essential to success at a university. But that's not what industry employers want or need. The biologists and chemists who discover a new drug work closely with the engineers who scale it up and turn it into a product. Both those groups rely on teams of regulatory and clinical professionals to help take the next steps. "Teamwork" is more than a buzzword in industry; it's a way of life.

Rules That Are True But Should Not Be

It takes a 60-hour work week to be a success in science. Is there *any* job in the biotech industry where successful people work a normal 40-hour week? I don't think so. "Normal" was replaced long ago by early-morning meetings, evening work, and Saturdays in the office or lab. Success in either track—academic or industry—starts at 50 hours a week and may average 60 to 65. Wouldn't it be nice for your family and outside interests if this rule were not true? A recent work-life balance feature in *Science* Careers featured an article on part-time scientists and another on corporate work/life policies that include part-time work. So this rule may not be universally true, but it almost is.

It's really hard to find a job once you are over age 45. Let's hope all your job searches occur while you're still young. Once you're past about 45, searching for a job becomes very difficult, assuming you're approaching it via the usual anonymous application. Although it rarely rises to the level of overt age discrimination, employers often note your years of experience and use words like "overqualified" to describe you. It's wise to have a large bank of networking contacts, an established reputation, and a head of steam when you face a sudden, unexpected, late-career job search.

You generally have to relocate to the coasts in order to find a biotech job. It would be great if there were biotechnology clusters equivalent to San Diego, San Francisco, or Boston in all regions. But despite the many states where policy makers promote biotechnology as a future economic development engine, there probably never will be more than 10 or 12 major biotechnology clusters in the United States. Very likely, in the future as in the present, the great majority of good biopharma jobs will be in biotech centers at the coasts. It's a tough reality for a person wanting to stay in the Midwest. Of course it's always possible that other biotech centers could develop, such as agritech in the Midwest, or nanobio in Texas.

Rules That Are Not True But Should Be

Promotion rewards strong leadership skills. Strong leadership skills are the first thing you'd think of when someone moves up the ladder into a management job. Unfortunately, it doesn't always work that way. Sometimes the person the most skilled in company politics gets promoted instead of the

Strong leadership skills are the first thing you'd think of when someone moves up the ladder into a management job. Unfortunately, it doesn't always work that way.

one with the best leadership skills. Then, there's that excellent communicator who just talks his or her way into the job, despite their lack of leadership ability.

Good science always sells itself. Many scientists were taught in academia not to worry about a job—to focus instead on doing good science. Unfortunately, for a lot of people this approach doesn't work. In industry, you have to be able to communicate your strengths, which can be really difficult. You need to stand up for who you are and what you are good at—a type of ethical self-promotion that is very difficult for many scientists to get their arms around. Moving past the ethical point—to self-promotion not grounded in ability—looks like playing politics. That kind of self-promotion is risky.

Bright scientists have excellent people skills. People skills and scientific skills don't necessarily go hand in hand. There's a lack of interpersonal-skills training and evaluation in academia, which leaves many technical people believing that decisions about their future will be based upon their scientific credentials and not those "soft skills" I talk so much about in Tooling Up. Of course, it's possible for really brilliant scientists to succeed without social skills—we've all known first-rate academic scientists who succeeded via sheer brilliance, never mind the fact that no one could stand working with them. But unless you're really cocky about your science—or totally lacking in social potential—your chances of success will be better if you bathe, communicate, and treat your colleagues with respect.

Different Rulebooks for Different Environments

At a recent AAAS seminar in San Francisco, our invited panel included two of our *Science* Careers Discussion Forum advisers and two senior executives from the local biotech industry. The goal that night was to discuss the lessons our speakers had learned along the way, what mistakes they had made, and to pass their wisdom along to the younger folks in the audience.

The common thread in all the speakers' remarks was that the "rulebook" is different in industry. All these professionals had succeeded, but for every one there was a time in their careers when they were poised between jumping over the wall between academia and industry and falling through the cracks. Only by learning all three types of rules—and how they differ from one job sector to the other—did they navigate the move from an academic lab to an industry job.

Transferable Skills and Portable Careers

From: dx.doi.org/10.1126/science.opms.r0700030

By Christie Aschwanden— First published April 20, 2007

Success in today's job market requires more than just solid lab skills and a stack of publications. Whether seeking tenure-track academic jobs, industry research positions, or nontraditional science careers, many job seekers are finding that a well-honed pipette thumb is not enough to land them an offer. "I don't know anyone who's gotten a job who spent their postdoc at the bench the whole time," says Crystal Icenhour, who was recently hired as vice president and director of research at IDX Labs, a startup in Charlottesville, Virginia.

Postdocs must develop skills beyond the laboratory if they're to be competitive in the tightening job market, says Icenhour. Where nonacademic jobs once required skills that did not carry over to academia, that's not necessarily the case these days, says Gregory Kopf, who spent more than two decades at the University of Pennsylvania before moving to Wyeth Research. He has since returned to Penn as an adjunct professor. "When I first started in academia, the training skill sets were very different for industry and academia, but the lines are starting to become a lot more blurred," says Kopf. "Leadership, project management skills, the ability to develop goals and manage budgets and your lab—these are skills that are just as important for academia as for industry."

The ability to work well in a team is the No. 1 skill that industry employers look for, says Neil Stahl, senior vice president of research and development sciences at Regeneron Pharmaceuticals in Tarrytown, New York. "You have to be able to sort through issues and communicate effectively in a nonthreatening way."

Academic scientists also need team skills so they can work effectively on committees and form successful collaborations. Running a lab or working on a research team both demand strong interpersonal skills and diplomacy. "You have to be able to say the right things without antagonizing your colleagues, and that's a skill that many postdocs don't have," says Chee-Keng Ng, a principal research scientist at Wyeth Biopharma in Andover, Massachusetts. "We need people who can fit into the teamwork culture."

Whether the goal is to secure NIH funding or to sell the corporation on a novel idea, success hinges on the ability to communicate. "How you package and present your data matters, especially in a large company," says Ng. "You need to be able to communicate well, especially to people who aren't as expert as you. You have to be able to explain the science to the managing director on the project," says Stahl.

Project management is another skill in high demand. "In academia, you have to manage your research so you're competitive for the next funding round. In industry, you have very tight timelines, and you have to manage your project so you can meet those deadlines," says Kopf. Meeting project goals requires effective management of people and time, yet many postdocs don't recognize the importance of honing management skills until they start

sending out their resumes, says Philip Clifford, associate dean for postdoctoral education at the Medical College of Wisconsin in Milwaukee.

"When you get to a postdoc, there are virtually no rules," Clifford says. Many postdocs lock themselves in the lab and hope that their toil will pay off in publications that lead to the job they want. "People feel that they need to do project after project and publish, publish, publish," Clifford says, but he suggested that they need to develop skills beyond the bench too, even if it means getting out of the lab.

Charting a Path

From the start, postdocs should identify the skills they need to make themselves marketable in their chosen career path so they can maximize their training, and the sooner the better, says Clifford. "We propose that people go through a self-assessment process to identify their own values, skills, and interests and then look at the potential universe of jobs that fit those," he says. ScienceCareers.org website offered by AAAS (American Association for the Advancement of Science) and books like Cynthia Robbins-Roth's *Alternative Careers in Science: Leaving the Ivory Tower* are good places to start. "Do some informational interviews with people in the career path you're interested in and find out what skills they use, then figure out what you need to do to get them," says Clifford. Some institutions employ career counselors that specialize in science. For instance, the Medical College of Wisconsin has hired a career adviser specifically to work with postdoctoral fellows and medical students.

Robert Tillman, postdoctoral program coordinator at New York University School of Medicine, advises budding scientists to create an individual development plan (IDP), through a process like the one developed by the FASEB Training and Careers Committee. Creating an IDP involves a four-step process to identify a well-suited career path and formulate a plan to achieve it. Tillman's institute has adopted IDPs as part of its postdoctoral handbook. "It's a way to focus my strengths and weaknesses in relation to my goals," Tillman says. "If I'm a postdoc and in four years I want to become faculty, what do I need to do to achieve that? How do I get there?" An IDP provides the roadmap for getting from a postdoc to a dream job.

Some postdocs expect that they will try for a tenure track research position and, if that doesn't work out, then they'll think about a plan B. But this type of approach sets postdocs up for failure, says Clifford. "Keeping your options open is exactly the wrong approach. You're not really doing the things that will direct you toward a specific career." There simply aren't enough tenure-track positions to go around, so postdocs should have an alternate plan in place from the start, Clifford says.

Many postdocs tell themselves that if they don't land a job at a top research institution, then they'll just apply for a teaching

position. But that's a mistake, too, says Clifford, because teaching-oriented universities want people with proven teaching skills. "If your goal is to work at a teaching institution, you need to figure out how to get that experience," he says. Regardless of what career path you hope to follow, "you need to identify the skill sets that are necessary for that career option, and figure out how you're going to get those," says Clifford. Someone seeking a job in biotech, for instance, might consider a business course or even an M.B.A., he concludes.

Managing to Learn

Bench skills are just one component of a successful science career, yet they've long been the focus of graduate and postdoctoral training programs. "Whether you run your own academic lab or take a position at a company, learning how to manage people, projects, and budgets are necessary skills, but traditional graduate and postdoctoral training do not offer formalized courses in these topics," says Garth Fowler, outreach program manager for ScienceCareers.org. But that's changing as AAAS, ScienceCareers.org, and other organizations step in to fill the void with courses and workshops devoted to these topics.

In 2002 and 2005, the Burroughs Wellcome Fund and the Howard Hughes Medical Institute partnered on a course to teach laboratory management skills to postdocs and beginning faculty members. Though the course's focus stood squarely on the needs of the academic scientist, many of the skills taught, such as time management, project management, collaborations, and mentoring, carry over to nonacademic jobs as well. Organizers have turned the course into a book, *Making The Right Moves: A Practical Guide To Scientific Management For Postdocs And New Faculty* available for free from the HHMI website (www.hhmi.org/resources/labmanagement).

In 2005 organizers of the BWF/HHMI program put on a "train the trainers" course in an effort to encourage similar programs at institutions across the country. "They wanted to spread the wealth," says Lisa Kozlowski, assistant dean for postdoctoral affairs and recruitment at Thomas Jefferson University in Philadelphia. Kozlowski attended the course and then, with support from AAAS and ScienceCareers.org, collaborated with three other Philadelphia-area institutions to develop a lab management course for postdocs from all four institutions.

A total of 55 postdocs enrolled in the Philadelphia Scientific Management Course, which is ongoing and split into four sessions spread over five months (www.tju.edu/JCGS/postdoc). Topics include leadership skills, time management, project management, funding, mentoring, and landing a faculty position. Vera Hintz, a postdoc in TJU's department of dermatology, is attending the course and says it prodded her to look for opportunities to gain skills that will enhance her resume. When she looked at job ads, she saw that many wanted experience planning meetings, so she volunteered to help plan the TJU's postdoctoral research symposiums. Hintz says the course has taught her to view her career as a project that she needs to manage, rather than just something that simply unfolds on its own.

Laboratory management courses like TJU's are becoming more common. Last November, the New York University School of Medicine, also with support from AAAS and ScienceCareers.org , put on a two-day workshop,

Management Skills for Scientists, open to 25 people. "We wanted it small so it would be interactive," says Tillman of NYU. Postdoc Marie-Hélène Delmotte attended the course and says it helped her recognize that her lab skills alone might not be enough to land her the position she wants. "My resume is good but I realized that I need more to find a job. I need to know myself and know how to sell myself." Delmotte says the program helped her understand the importance of developing short-term and long-term goals for her career. Instead of focusing solely on her research, she is putting energy into mentoring, an effort that will pay off in a skill she can add to her resume.

The management course is just one way Tillman's institute is promoting career development. The school's office of learning and development offers courses on topics ranging from how to give an effective presentation to managing conflict and running meetings. Tillman says that NYU also helps about a half dozen of its postdocs enroll in a 16-week Fundamentals of the Biotech Industry course at the Center for Biotechnology, a state-funded center created to support the region's growing biotech industry.

Acting the Part

Of all the laboratory management courses that have sprung up, perhaps the most innovative is the Laboratory Management Institute at the University of California, Davis. The institute holds a three-week intensive program divided into five courses: leadership, management, best practices, mentoring, and innovation. Participants come from a wide range of disciplines and receive a certificate and 14 credit hours through the UC-Davis extension.

The program's hallmark, Lab Act, employs professional actors to play out the concepts explored in the course. Instructors discuss strategies for handling management issues, then actors play out scenarios that workshop attendees anonymously submit. Participants discuss what happened and work on new solutions that the actors then try out. "We're all about practicing," says LMI director John Galland. "We use Lab Act to allow students to try out different solutions without putting anyone on the spot."

In addition to the summer program, LMI offers a year-long program for postdocs. "I'm impressed at how effective it has been to watch the actors role play," says participant Tamara Holst, a postdoc at the Public Intellectual Property Resource for Agriculture. "It's almost uncanny how well the scenarios translate across different labs, and the way to defuse a situation is usually similar across the board."

Taking the Initiative

Formal programs like LMI's are not yet the norm, but even without them, motivated postdocs can find ways to develop useful and necessary additional job skills. Icenhour of IDX Labs made her resume stand out from the rest by getting involved in the postdoc-

toral associations at the Mayo Clinic in Rochester, Minnesota, and at Duke University where she did a second postdoc. She also joined the board of National Postdoctoral Association and credits this experience with teaching her the skills she needed to land her current job as vice president and director of research.

"My NPA experience really emboldened me," says Icenhour. "As a board member of NPA you're reviewing the employee handbook, revising budgets, and running committee meetings. The experience introduced me to a lot of the things I do in my daily work life now." Not every postdoc has the luxury of enrolling in an institute-sponsored program like LMI, but as Icenhour's experience illustrates, motivated postdocs can create their own opportunities to learn skills beyond the bench if only they would step out of the lab.

Opportunities: More School?

From: dx.doi.org/10.1126/science.caredit.a0700068

By Peter Fiske—First published May 11, 2007

In this column, and in every career workshop I lead, I emphasize how Ph.D. training can prepare you to be an adaptable problem solver, capable of taking on a wide range of demanding assignments with little assistance. Developing your own research, tackling a range of technical challenges, figuring things out on your own, and pulling it all together into an original piece of scholarly research is, I argue, very similar to the real-world challenges entrepreneurs and other business leaders face when they build companies. Like the Ph.D., building a business is about doing, not learning. So, in some respects, a science Ph.D. is excellent training for people interested in starting—or leading—a business.

Yet, there's no doubt that entrepreneurship and business management require skills—accounting, law, finance, and a million other topics—that no Ph.D. program I know about teaches routinely. So, if you think you might like to start your own company, or take on a high-level role at an existing early-stage company, you're bound to consider adding an M.B.A. to your degree collection. A Ph.D. is great on fundamentals—it teaches you how to make something completely on your own—but it falls short on the practical stuff every entrepreneur has to master. Those practical skills are the specialty of the M.B.A.

So should you get one? And if you decide to get one, how can you do it as cheaply and conveniently as possible? These are the subjects of this month's "Opportunities."

M.B.A. Versus Ph.D.

Each degree has its merits for entrepreneurship, and each gives you skills and experience totally missing from the other.

Most full-time M.B.A. programs take two years, and part-time programs usually take three years or more. Most of the work is coursework, with an emphasis on practical skills and "case studies": select vignettes used to illustrate specific issues in business. Full-time M.B.A. training usually involves

The principal downside of the M.B.A., of course, is that it takes two more years of expensive school—and it's not only the tuition and fees that make it expensive.

some practical work experience—a paid internship, you might say, usually between the first and second years—which gives you some extra experience and helps pay some bills.

The Ph.D., as most of you know, is very different. Unlike any other professional degree, the Ph.D. is about *doing* rather than just *learning*. Some argue that a Ph.D. isn't a professional degree at all—not a preparation for professional practice—but, rather, an opportunity to acquire knowledge for its own sake. I think this is disingenuous and one of the problems with the Ph.D. degree—but let's save that for another column. Although there is a lot of coursework at the beginning of many Ph.D. programs, the textbooks tend to disappear after two years, if not sooner. After that, you drill into a single subject and work for years to produce an original piece of scholarship largely by yourself. I have described this as being marched to the edge of human knowledge and being told to take the next step on your own.

To M.B.A. or Not to M.B.A. ...

If you are getting or already have a Ph.D. and you think you would like to steer your career away from the bench and toward business—especially entrepreneurship—you have two choices: Go back to school for the M.B.A., or make the transition to a startup directly. There are advantages to both approaches.

One of the principal advantages of an M.B.A. is that the job opportunities at early-stage companies are excellent for M.B.A. grads. Not only will you have all the knowledge and experience of a Ph.D.; you'll also have the practical knowledge an M.B.A. provides. Add to this the fabulous network you'll acquire in business school—faculty members, fellow students, alumni—and the M.B.A. can be a compelling path. Many of the people you'll be learning from, and alongside, have direct experience in the technology startup arena, so you'll have a lot of experience to tap into.

The principal downside of the M.B.A., of course, is that it takes two more years of expensive school—and it's not only the tuition and fees that make it expensive. The opportunity cost of those two years—the salary and experience you forgo to attend more school—are even higher than the tuition. It's a good thing these masters of business earn a lot right out of school: There would be no way to pay the cost otherwise!

Depending on your ambitions, an M.B.A. may be completely unnecessary. In some industries, such as biotech, the path to a leading business role is well established for Ph.D. scientists, even those without M.B.A.s. Because the work in biotech involves a high technical component—and because many biotech companies are started by Ph.D. scientists—you'll find Ph.D.s throughout management. Software engineering startups may also recruit Ph.D.s without any business exposure. And it might be possible to join an early-stage startup as a technical expert; if you can manage, you will have plenty of opportunity to grow into a business role.

When to get an M.B.A. is as important a question as whether to

do so. Going straight from a Ph.D. to an M.B.A. is not advisable. For starters, you'll be more attractive to prospective M.B.A. programs if you have a few years of work under your belt. Second, getting multiple degrees without accumulating real-world work experience might turn off certain—although certainly not all—hiring managers. So if it's possible, work for a couple of years before going back to your M.B.A. Your training might end up being cheaper this way. Best of all, if you go to work first, you may find you don't need an M.B.A. after all to do what you want.

Having Your Job and Eating It Too

It is possible to maintain a professional career *and* get an M.B.A. by enrolling in a part-time program that meets evenings, weekends, or both. Part-time programs often are populated by people like you: older, often technical, steering their careers in new directions. I got my M.B.A. at the University of California, Berkeley, in the evening program, where two-thirds of my classmates were engineers who worked full-time. There are *lots* of part-time M.B.A. programs, including a number that teach entirely online. Just like full-time programs, the reputations of part-time programs vary widely. If you are interested in working at a startup or an early-stage company, look for M.B.A. programs that have a strong entrepreneurship focus. Not only will the curriculum be better suited for your ambitions, but the network and alumni contacts will be more fruitful as well.

If you are already employed, ask whether your employer will pay for some of your M.B.A. training. Many, especially larger, employers have programs to subsidize the cost of higher education for their employees. In my evening M.B.A. program, two-thirds of my classmates had some of their tuition paid by their employers. Nearly 20 percent had all their tuition paid for.

Here are some factors that might favor a decision to go back for an M.B.A. to support your entrepreneurial urges.

- You want to make a career transition soon.
- You want to obtain a breadth of skill that would support an entrepreneurial career.
- You have one or more excellent, and appropriate, part-time or full-time M.B.A. programs in your region—assuming you have geographical constraints.
- Your employer may subsidize your M.B.A. education.

Here are some factors that might steer you away from an M.B.A.

- You're not in a hurry.
- You're in a field in which technical people often move into management and business roles without additional training.
- There are no good entrepreneurship programs at any of the business schools that are, realistically, available to you.

- The opportunity cost of stepping out of your career path would be too high—although you can still consider a part-time M.B.A. in this case.

Whether an M.B.A. is right for you is, of course, a function of where you want to go professionally. Neither degree is a hedging strategy for professional indecision! As with the Ph.D., the best way to ensure that your investment in an M.B.A. pays off is to know what you want out of it. That requires some vision for yourself and your professional future. That's something you need to sort out *before* applying.

Additional Articles Online

Hidden Talents, Hungry Markets: Ph.D.s Have Many Skills to Offer Industry
dx.doi.org/10.1126/science.caredit.a0700081

Tooling Up: The Finer Points of Giving a Job Talk
dx.doi.org/10.1126/science.caredit.a0800093

Tooling Up: Employment Due Diligence
dx.doi.org/10.1126/science.caredit.a0700022

Tooling Up: Employment Due Diligence, Part 2
dx.doi.org/10.1126/science.caredit.a0700036

Industrial Postdocs: The Road Less Traveled
dx.doi.org/10.1126/science.opms.r0800055

The Postdoc Experience: Not Always What You Expect
dx.doi.org/10.1126/science.opms.r0800058

Interdisciplinary Research: Building Bridges, Finding Solutions
dx.doi.org/10.1126/science.opms.r0700032

This booklet is also available online at sciencecareers.org/careerbasicspdf