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BizEd (USPS 1884) is published six times a year by AACSB International—

The Association to Advance Collegiate Schools of Business
777 South Harbour Island Boulevard, Suite 750, Tampa, FL 33602

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www.aacsb.edu bized.aacsb.edu

ISSN number: 1537-338X

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Subscription: The yearly rate is US\$35.

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to adopt rapidly changing technology ... if they want to prosper during the 21st century of work.” In “Building on Blockchain,” we take a closer look at what might be the biggest technological change to impact business and government—three professors who study blockchain say that its ability to aggregate data securely could have huge implications not only for the transactional economy, but also for data analytics, robotics, and AI.

But even as technology continues to disrupt and transform business, business schools can rely on one constant to guide them: their inherent values. That’s the message from Berkeley Haas’ Rich Lyons in “Defying Disruption with Differentiation.” As they move forward into an uncertain future, he says, “business schools increasingly will say, ‘We stand for this. Other schools stand for that.’”

In the last few years, people have marveled at the abilities of IBM’s supercomputer Watson, and they’ve grown more accustomed to interacting with digital assistants like Apple’s Siri, Microsoft’s Cortana, and Google’s Alexa. But these AI systems aren’t yet perfect—and because we still interact with them via static devices, they don’t seem so different from technologies we’ve used in the past.

But the machines are learning. The likes of Bina48, Sophia, and increasingly intelligent AI systems inevitably will become more mobile, more humanlike, and more integral to our personal and professional lives. It’s easy to be, well, uneasy about what that will mean in the years to come. But as NDNU’s Barry points out, with these changes come new opportunities—and where there are opportunities, students and faculty alike will have a great deal to learn.

A handwritten signature in black ink that reads "Tricia Bisoux". The signature is fluid and cursive.

Tricia Bisoux
Co-Editor

The Future Is Here

AFTER READING TWO news stories last fall, I came to an unsettling realization: The theoretical future dreamed up by science fiction writers is no longer on the horizon. That future, apparently, is here.

In October, Saudi Arabia made news at the Future Investment Initiative summit in Riyadh, when it granted citizenship to Sophia, a humanlike robot created by Hanson Robotics. Sophia told summit attendees that she was “very honored and proud for this unique distinction.” While her unveiling likely was largely for publicity, her presence is a glimpse into how quickly artificial intelligence (AI) could move from curiosity to commonplace in our daily lives.

Soon after, in December, Notre Dame de Namur University (NDNU) in Belmont, California, reported that a robot named Bina48 had completed The Philosophy of Love, a course taught by William Barry. “The other students and I learned so much about the human experience and love as we tried to explain our emotions to Bina48,” said Barry. “We need to get over our existential fear of robots and see them as an opportunity. ... If we approach [AI] with a sense of the dignity and sacredness of all life, then we will produce robots with those values.”

Where does business education fit into this evolving technological landscape? That’s a question we explore in this issue. In “Learning in the Digital Age,” for example, McKinsey’s Nick van Dam stresses that “business schools must be prepared

Higher education that meets higher expectations.

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(see inset)

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The Essence of Scholarly Impact

BUSINESS EDUCATORS CALL FOR NEW MEASURES OF RESEARCH QUALITY

WHAT IS THE MEANING of scholarly impact? How can researchers know when they've achieved it, and how can their schools best reward it? These nuanced questions are the subject of a project from the Academy of Management (AOM), which was undertaken to provide "both a mirror and window to comprehend better the complex, pluralistic nature of scholarly impact."

The project, conducted by the organization's Practice Theme Committee (PTC), consisted of a qualitative study and a quantitative survey of members. The PTC received responses from 700 members, who included professors, lecturers, doctoral candidates, and business students. These members were based worldwide, with the majority (57 percent) located in North America.

According to respondents, the top five indications of impact of research include publication in top-tier journals, citations by

other researchers, use as the basis of a scholarly book, ability to attract competitive grants, and publication in practitioner-focused outlets. Respondents perceive that the top five audiences for management research are other management academics, managers and decision makers at companies, governments and policymakers, social science academics, and students.

As a group, respondents note that management research currently has the greatest influence over the research and teaching of other management academics. They also recognize strange paradoxes that researchers often face. For example:

- The majority of respondents believe that scholarship affecting management practice and government policy can be an "intensely" or a "strongly important" indicator of impact. Only a minority (38 percent) note that their own institutions support such scholarship.

- The majority also believe that interdisciplinary research "definitely" or "probably" can have greater impact than single-discipline research, but they note that such research is more difficult to publish in top-tier journals. Yet many institutions use publication in top-tier journals as a leading measure of scholarly impact.

- Finally, even though the majority of respondents find that journal lists, journal rankings, and impact factors applied to journals "definitely" or "probably" do *not* reflect journal quality or scholarly impact, these measures are still used widely by academic institutions to evaluate faculty contributions.

When offered the opportunity to write in more detailed responses, many respondents expressed their frustration with the status quo. One professor wrote, "The academic, theoretical discussion currently taking place in the major journals [has] no impact whatsoever, but nobody dares to admit that." Another wrote, "Do we save lives?"

Do we help companies not die? Do we save jobs? If so, these are the impacts. If not, and I suspect we don't, impact is just citation-based and self-referenced within academia."

Given that such paradoxes run exactly counter to the aim of management research, respondents recommended several ways that AOM could move past them to help management research have a wider influence on policy and social change:

- Create broader definitions of scholarly impact beyond citations and top-tier journal publication.
- Provide incentives and mentorship to encourage faculty to pursue research with greater impact.
- Place greater weight on publication in practitioner journals.
- Invest more in translating research for practitioners.
- Reach out beyond academia to engage with practitioners and others who are "actually on the firing line," as one respondent put it.
- Work together with other academic organizations that represent business disciplines to shift the definitions of scholarly impact.

The PTC's report concludes that while scientific rigor and academic productivity will always be important to management research, those two factors alone are no longer a sufficient measure of the extent to which the activities of researchers contribute to the teaching and practice of management. The report, its authors write, is meant to help "AOM's scholars, academic institutions, and regulatory bodies ... identify avenues for more practice-relevant scholarship that would enhance research, put knowledge into action, and achieve scholarly impact."

► "Measuring and Achieving Scholarly Impact" is available at aom.org/uploadedFiles/About_AOM/Strategic_Plan/AOMScholarlyImpactReport.pdf.

MR. ROBOTO AT YOUR SERVICE

If you've stayed at the Henn-na Hotel in Japan, you might have been checked in by a robot that operates the front desk without human supervision. If you've shopped at a Lowe's Home Improvement store, you might have been assisted by the LoweBot, which helps consumers locate products while also managing the store's shelf inventory. How might such service robots influence customers' frontline experiences in the future?

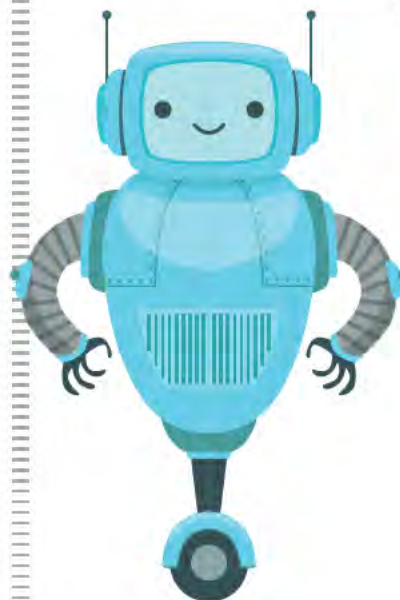
A team of researchers recently wanted to learn how service outcomes such as satisfaction, loyalty, and engagement are affected when robots have a "high automated social presence"—that is, when they appear more like humans. The researchers include Jenny van Doorn of the University of Groningen in the Netherlands; Martin Mende of Florida State University in Tallahassee; Stephanie Noble of the University of Tennessee Knoxville; John Hulland of the University of Georgia in Athens; Amy L. Ostrom of Arizona State University in Tempe; Dhruv Grewal of Babson College in Wellesley, Massachusetts; and J. Andrew Petersen of Pennsylvania State University Park.

The team posits that different kinds of robots will be required in different service settings. For instance, robots that participate in communal relationships—such as those providing nonmonetary services, including health-care—should seem kind, warm, and responsive. On the other hand, robots participating in exchange relationships—such as those carrying out transactions at a bank—should primarily display competence. "Customers have tendencies toward one or the other mindset when they approach service relationships," says Ostrom.

The researchers note that humans have a tendency to personify objects, which means that more anthropomorphized products will lead to even better outcomes. But they emphasize that some individuals are more ready to embrace robotic technology than others, so companies need to know where their own customers stand in terms of the types of robots they're willing to deal with on a regular basis.

Even so, we're already interacting with digital assistants, these researchers point out. "Many already have this entity they're talking to every day in their house—Alexa or Cortana or Siri—and asking questions. It is woven into their daily experience already," says Ostrom. "Taking it from there to a mobile robot you're talking to—the leap doesn't seem so far."

► "Domo Arigato Mr. Roboto: Emergence of Automated Social Presence in Organizational Frontlines and Customers' Service Experiences" appears in the February 2017 issue of *Journal of Service Research* and can be read at journals.sagepub.com/doi/full/10.1177/1094670516679272.



Immigrants on the Fortune 500

IMMIGRANTS ARE GOOD for business, according to new research by the Center for American Entrepreneurship (CAE), a nonpartisan research and advocacy organization based in Washington, D.C. The organization analyzed the national origins of the founders of the 500 largest publicly listed and private companies as determined by the Fortune 500 list for 2017. Its researchers discovered that 43 percent of these companies were founded or co-founded by immigrants or children of immigrants.

In addition, first- or second-generation immigrants were the founders of slightly more than half of the firms in the top 25. Immigrant-founded Fortune 500 firms are headquartered in 68 met-

ropolitan areas across 33 states, employ 12.8 million people worldwide, and accounted for US\$5.3 trillion in global revenue in 2016.

The CAE report notes that American policymakers should consider these facts as they deliberate the fate of 800,000 so-called Dreamers—undocumented immigrants who were brought to the United States illegally as children—and U.S. immigration policy more generally. In particular, the analysis supports the notion of an entrepreneur visa, one component aspect of the Startup Act, which is bipartisan legislation intended to encourage the viability of startup companies through changes in tax and immigration policies.

The analysis demonstrates “the remarkable and persistent importance of immigrants to the creation and growth of America’s largest and most valuable companies,” says Ian Hathaway, CAE’s director of research, who led the analysis underlying the report. “Our work also shows that many of America’s most iconic entrepreneurs migrated here from a wide range of geographic and socioeconomic backgrounds—it is questionable whether some of them would have been allowed to come here under current policy.”

► The full report for “Immigrant Founders of the 2017 Fortune 500” can be found at startupsusa.org/fortune500.

THE CONTENTMENT OF THE CONTRACT WORKER

Are freelancers happier than other professionals? Sixty-five percent of people surveyed believe they are, according to a September 2017 report by ReportLinker, which studies social and economic megatrends. The report examined people’s opinions about the “gig economy.” Other key numbers from the report:

26% of respondents say they would consider leaving the traditional workplace to become freelancers or independent contractors.

29% of current freelancers say they enjoy the freedom of being their own bosses, while 23 percent say they appreciate the better work-life balance.

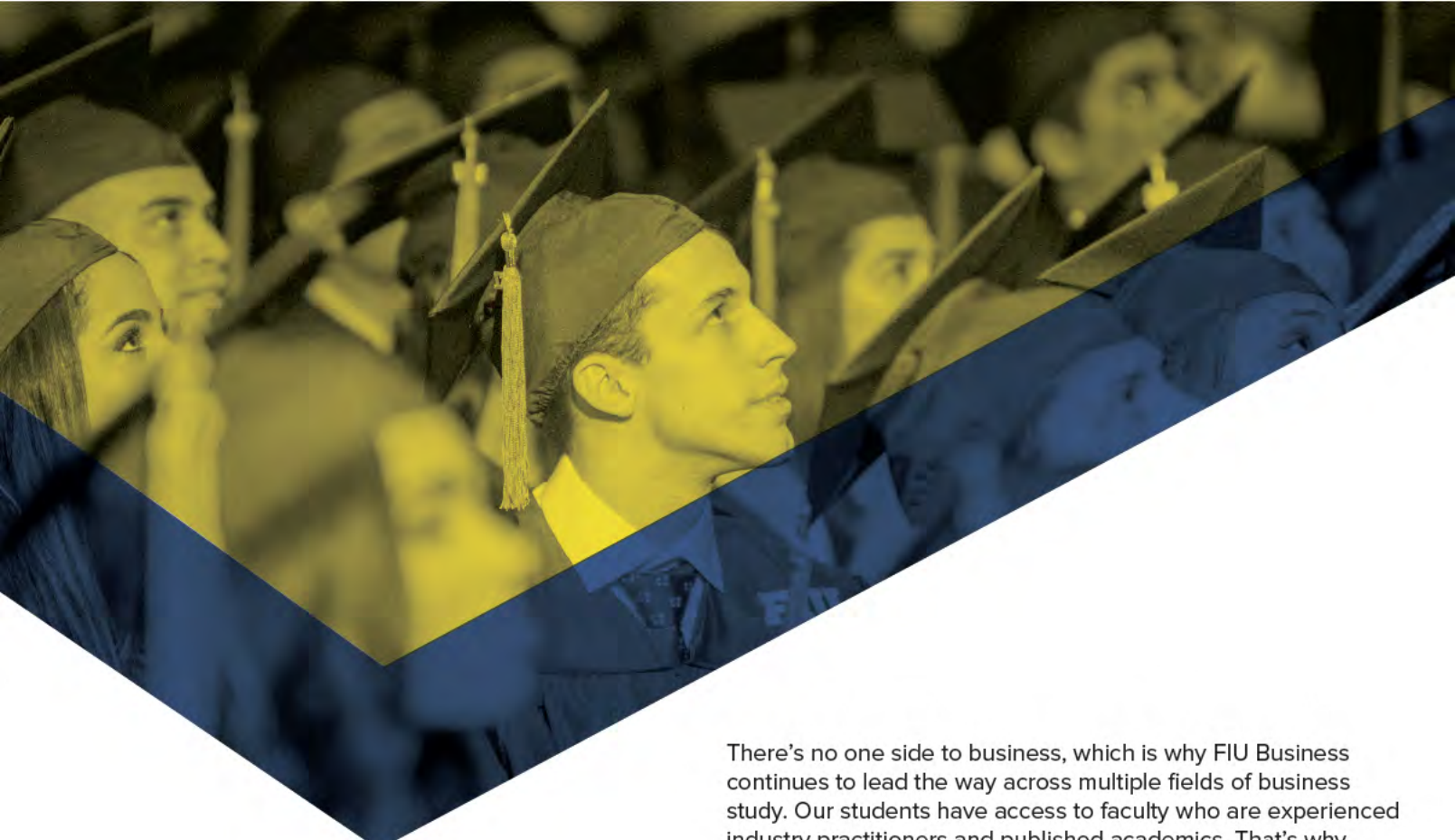
27% say the main drawback of being a freelancer is lack of retirement benefits. Nineteen percent cite low financial security and 18 percent point to lack of job security.

73% of freelancers feel a sense of purpose.

41% of freelancers work from home.

► “Happy in the Home Office, Freelancers Embrace the Gig Economy” can be read at www.reportlinker.com/insight/freelance-workers-gig-economy.html.





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TOO MUCH OPERATIONAL RISK might have been one of the major factors that led to the banking crisis of 2007–2009. That’s according to a new paper published by Brian Clark, assistant professor of banking and corporate finance at the Rensselaer Polytechnic Institute in Troy, New York, and Alireza Ebrahim of the Office of the Comptroller of the Currency in Washington, D.C. Using data collected by regulatory agencies, Clark and Ebrahim studied the activities of a sample of large U.S. banks. They concluded that a lack of prudent regulations in the years leading up to the crisis drastically exposed the banks to unnecessary operational risks.

Generally, they note, operational risk arises from the way a bank is managed or the way its systems and controls leave it vulnerable to fraud, legal claims, and external business disruptions. Operational risk does not include credit risk, which arises when a bank makes bad loans, or market risk, which occurs when a bank makes poor investment decisions. Authorities estimate that operational risk accounts for roughly 25 percent of the risk profile of large U.S. banks.

Why would banks leave themselves so vulnerable? Clark and Ebrahim argue that, in the years leading up to the financial crisis, banks assumed operational risks to get around regulations meant to limit total risk exposure—a practice known as regulatory arbitrage. The authors note that before the financial crisis, regulators considered operational risk benign, so they didn’t closely examine it in financial institutions. This opened the door for banks to increase their exposure over time without having to account for this risk on their books, ultimately allowing them to become riskier without regulators knowing it.

“Typically, there is a delay between the time of the risk and the financial loss,” explains Clark. “For example, banks can increase their exposure by not investing in or maintaining the latest information technology infrastructure or by cutting governance costs such as monitoring of employees. These actions can reduce costs or increase revenues in the short term, but in the long term they may lead to large losses from IT failures or misconduct by unmonitored employees.”

Ultimately, the banks’ risky operational decisions backfired, exacerbating the severity of the recession. Clark believes that banking controls such as the Dodd-Frank Act lead regulatory agencies to examine operational risk more closely today, making it less likely that it will contribute to another financial crisis in the future.

► **“Risk Shifting and Regulatory Arbitrage: Evidence from Operational Risk”** was posted June 26, 2017, at papers.ssrn.com/sol3/papers.cfm?abstract_id=2991789.

STUDENTS MAKE PURPOSE A PRIORITY

What do today’s 19- to 26-year-olds want most from their future careers? A sense of purpose, according to the Future Skills Survey conducted last summer by the University of Oxford’s Saïd Business School in the United Kingdom.

Eighty-nine percent of young people surveyed define success as having a positive impact upon society and others. In addition, 60 percent believe businesses should make a stronger commitment to corporate social responsibility, especially when it comes to solving global challenges.

More than two thirds—69 percent—anticipate having more than one career over their lifetimes, with half of respondents wanting to start their own businesses. This group cites flexibility and “good work-life balance” as their top priorities in their careers. “Earning a large paycheck” ranks eleventh.

The survey included responses from more than 3,700 individuals in the United Kingdom, the United States, South Africa, and China. Each respondent either was enrolled in a university program or had graduated in the last three years.

“Our survey results show that meaningful initiatives to address global agendas are no longer just ‘a nice to have,’ but rather are demanded by young people and others in society,” says Peter Tufano, Peter Moores Dean and professor of finance.

“We may be moving to a world in which individuals work in multiple industries and undertake several retraining periods in their long working lives. The challenge for business schools is to adapt and rethink the timing and structure of a ‘lifetime of education.’”



WHO WILL REDEFINE INNOVATION? SPARTANS WILL.



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No More Heroes

“ROMANTICIZING” POLITICAL LEADERS can be harmful because it prevents people from examining the logic of the leaders’ policies. According to new research, romanticizing leadership—the tendency to overattribute both success and failure to leaders, crediting them with being the driving forces behind everything that happens during their tenures—has been seen in recent political contests in both Europe and the U.S. In these cases, frustration with ruling parties led voters to choose politicians who promise a return to mythical golden eras.

A romanticized leader tends to possess strong vision, dissatisfaction with the status quo, and out-of-the-ordinary behavior. This notion of a hero-leader is particularly strong in the U.S., which has a dominant culture of individualism. But when people place their trust in a heroic leader, they ignore the tensions and contradictions in the hero’s practices and theories. That’s the conclusion of David Collinson of Lancaster University, Owain Smolović Jones of Open University, and Keith Grint of the Warwick Business School, all in the U.K.

The authors also suggest that romanticized leadership can reinforce the gendered dynamics that tend to promote men to leadership positions and lead other men to want to enhance their masculine prestige by association. They note that this raises serious issues about gender and masculinity, as well as race and ethnicity.

“Romanticizing leadership is bewitching because it offers an account of leadership drenched with imprecise mystique. It asks that we view leaders as privileged, holding a transcendent position above the fray of political or historical critique,” says Grint. “However, this is just a romanticized mirror image of an ideology that promises salvation.”

“No More Heroes: Critical Perspectives on Leadership Romanticism” was first published October 23, 2017, in *Organization Studies*.

MBAS ON THE RISE

QS Quacquarelli Symonds recently released its QS TopMBA.com Jobs & Salary Trends Report 2018 and its QS TopMBA.com Return on Investment Report 2018. Here are a few of its findings:

Demand for MBAs is up:

10% in U.S. and Europe

18% in Asia

13% worldwide

The average compensation for MBAs (in US dollars):

■ North America: **\$89,037**

■ Europe: **\$73,271**

■ Asia-Pacific: **\$63,948**

■ Global average: **\$79,829**

The global average ten-year return on investment of an MBA:

\$390,751

Global average time to payback for MBA investment:

51 MONTHS

Region with quickest payback time:

**EUROPE,
39 MONTHS**

The Jobs & Salary Survey is based on responses from 3,463 employers worldwide, and the ROI Report is based on the ROI of degrees from 200 full-time MBA programs. Find both surveys at www.topmba.com.

new projects

MEDIA MOOD SWINGS

In a working paper, **Heikki Lehkonen**, assistant professor at the University of Jyväskylä School of Business and Economics in Finland, and **Kuntara Pukthuanthong**, associate professor of finance at the University of Missouri Trulaske School of Business in Columbia, are using the tenets of behavioral finance to discover whether the positive and negative emotions expressed in news and social media posts can influence or even help predict stock market returns in the days after such content appears. The researchers will first focus on U.S. markets and media and next on those in different countries to determine whether national cultures and institutions change how emotional sentiments affect global markets.



STUDY DESKS

Researchers at the University of Michigan College of Engineering in Ann Arbor have received a US\$300,000 Improving Undergraduate STEM Education Program grant from the National Science Foundation to study how professors and students use classrooms with movable tables and flexible seating. **Cindy Finelli**, associate professor of electrical engineering, and research fellow **Aaron Johnson** are observing how students learn and interact in modular classrooms and asking faculty to share how the spaces have affected their teaching. So far, faculty have noted that monitors minimize distractions, while circular tables on wheels encourage students to get to know each other and work more effectively in teams. To view a video of the classroom in action, visit www.youtube.com/watch?v=Lfnf5s16fcs.

DATA DISCOVERY

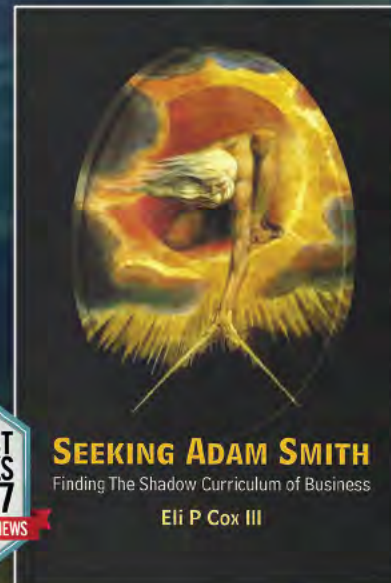
Bijan Raahemi of the University of Ottawa's Telfer School of Management in Ontario, Canada, has received a CAN\$105,000 Discovery Grant from Canada's Natural Sciences and Engineering Research Council to design and verify algorithms in the areas of healthcare, corporate finance, and engineering. As part of his research, Raahemi will analyze the data that social networks and organizations gather about their users and customers to discover behavioral and statistical anomalies. Such anomalies could be predictors in a range of contexts, from the severity of a particular flu season to the likelihood of a cyberattack. □

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BY NICK VAN DAM
ILLUSTRATION BY JOEY GUIDONE

Lifelong learning will be the hallmark of the Fourth Industrial Revolution. How can business schools prepare to educate tomorrow's workforce?

LEARNING IN THE DIGITAL AGE

WELCOME TO THE DIGITAL AGE. This era, marked by constant technological breakthroughs that repeatedly disrupt the business world, has been dubbed the Fourth Industrial Revolution by Klaus Schwab of the World Economic Forum. It's an era in which only the most nimble companies will survive—and only the workers who constantly re-educate themselves will continue to find jobs.

Two broad trends are shaping the digital age: an acceleration in the rate at which new technologies are adopted, and the ongoing disruption that these new technologies are causing to the economy.

Let's look at acceleration first. It took 38 years for radio to reach 50 million users globally. That time was 13 years for TV, three years for the internet, one year for Facebook, nine months for Twitter, 35 days for Angry Birds, and 19 days for Pokémon GO.

But it's not just games, devices, and platforms that are seeing widespread and rapid adoption. Innovations such as mobile computing, cloud technology, and big data already are changing the way business is done, and we'll see even more upheaval when robotics, artificial intelligence, autonomous transport, and the Internet of Things are incorporated into daily life.

Automation also will reshape business. A 2015 McKinsey Global Institute Study concluded that current technologies could automate 45 percent of the activities people are paid to perform; in fact, technology could automate 30 percent or more of the activities in 60 percent of all occupations.

These technological innovations will have a profound impact on the economy—indeed, some already have. In his 2001 book *Creative Destruction*, Yale professor Richard Foster took Joseph Schumpeter's famous theory and applied it to prestigious companies listed on the Standard & Poor's top 500 list. He noticed that their lifespans had dramatically declined from 90 years in 1935 to 18 years in 2011. He predicts that in 2027, the average lifespan of an S&P company will be 13 years or less, as companies fail, split, merge, or are acquired.

One final and nontechnological factor also will shape tomorrow's workforce: the fact that people will be living much longer than they have in the past. Data suggests that humans—at least, those in developed nations—have seen a three-month increase in life expectancy each year since 1840. And as they live longer, they will be working longer, well into their 70s or 80s.

Taken together, these trends indicate that workers can no longer expect to be employed at one or two firms for their entire careers, using skills they mastered in their 20s. This means that institutions of higher education must be prepared to deliver the skills and experiences that will ensure that tomorrow's workers are employable for as long as they want to hold jobs.

BECOMING LIFELONG LEARNERS

While 21st-century workers will need to master new hard skills to keep up with advances in technology, they also will need to develop softer practical skills. That's because tomorrow's jobs will require workers who can create content or judge the relevance of information. More than one-third of jobs will require workers who can solve complex problems. About one in five jobs will need workers with social skills such as emotional intelligence, a service orientation, and the ability to negotiate and collaborate with others.

In addition, about 15 percent of jobs will require cognitive skills such as creativity and mathematical reasoning. In fact, creativity will become one of the most important skills for the workforce, because creative people will invent new business models, products, ways of working, and customer experiences.

Finally, the Fourth Industrial Revolution will require a workforce with a

wide range of deep knowledge and easily transferrable skills. The World Economic Forum estimates that 65 percent of today's elementary school students might ultimately work in jobs that don't exist today. Therefore, it's essential that tomorrow's workers not only have a broad range of skills, but understand how to gain new ones. They must become adept at lifelong learning.

In some countries, lifelong learning is already a priority. The European Union has developed an indicator for measuring lifelong learning, which it defines as the percentage of the population aged 25 to 64 that is participating in education and training. In 2014, the best-performing European countries were Denmark (with 32 percent of the population engaged in learning), Sweden (28 percent), and Finland (25 percent). Denmark's number might be so high because it allocates funding for two weeks of certified training every year for adults; it also emphasizes in-work training.

Learners for Life



Seven practices and mindsets will help tomorrow's workers become lifelong learners. Individuals can assess their own openness to learning at www.reachingyourpotential.org.

Source: Van Dam 2016.

It will be these lifelong learners who continue to be employable in an economy marked by disruptive technologies and evolving job requirements. But how do people become lifelong learners? Studies show that they employ seven distinctive practices or mindsets that aid them throughout their careers.

1 THEY FOCUS ON GROWTH.

Stanford psychologist Carol Dweck, who has studied learners intensively, has concluded that the type of mindset a person has will have a significant impact on how much that person learns. In her 2006 book *Mindset*, she differentiates between people with fixed mindsets and those with growth mindsets. These two models predict how much effort learners will expend, how much risk they will take, how they will perceive criticism, and whether they will be willing to accept and learn from failures.

People with fixed mindsets believe their potential is finite, based on their genes, heritages, or socioeconomic backgrounds. They might say, “I’m not a good learner, so I shouldn’t take the courses offered by my company.”

By contrast, people with growth mindsets believe their true potential is unknown because they can’t foresee what they might achieve when they approach something with passion, effort, and practice. They perceive challenges as opportunities for personal growth.

Other studies suggest that intelligence is not fixed at birth but can be developed over time. For instance, in a 2012 paper, psychologist Jesper Mogensen writes that “our brain is like a muscle that gets stronger with use, and that learning prompts neurons in the brain to grow new connections.”

One fascinating study began in 1932, when the entire population of Scotland’s 11-year-olds—87,498 of them—took IQ tests. More than 60 years later, the test was repeated, with 500 of the original individuals participating. The results showed a .66 positive correlation between advancing age and improved IQ.

That is, it showed that the average individual IQ scores at age 80 were much higher than scores at age 11.

A completely different perspective on IQ came in 2008, when researchers administered tests to the ten best chess players in the world and discovered that three had below-average IQs. How was this possible? Researchers found that those three individuals had mastered the game by playing between 10,000 and 50,000 hours of chess. Many studies have confirmed that it’s not necessarily intelligence that makes people experts, but effort and practice.

The most successful people practice for the greatest number of hours to push themselves beyond their current levels of competence and comfort. They also are lifelong learners who are committed to growth mindsets and believe they have an endless capacity to learn. It’s that attitude that makes them valuable workers who can constantly master the new skills they need in the changing job market.

2 THEY BECOME SERIAL MASTERS.

To stay employable, workers will need to develop deep expertise in multiple areas over the lifespan of their careers. In her book *The Shift*, London Business School professor Lynda Gratton argues that we’ve seen the end of the “shallow generalist” who knows a little about a lot of different topics. In a world of Wikipedia and instantly accessible information, surface-level knowledge is useless. Workers in the 21st century will depend on their intellectual capital to bring value.

For many years, people have followed a T-shaped profile of knowledge mastery, developing deep expertise in one discipline early in their careers and supplementing this with broad competencies gained on the job. But this model is no longer sustainable; today they must develop M-shaped profiles of knowledge.

More specifically, workers will need to develop deep expertise in a number

of different areas over the course of their careers. They’ll combine that deep expertise with broader knowledge they acquire on the job.

For instance, a journalist might enter the workforce with a bachelor’s degree in journalism. As she specializes in business reporting, she might pursue a master’s degree in business economics. As economics becomes more complex over the next decade, she might enroll in classes on related topics such as digitization. She will need to constantly evaluate the sell-by date of her current skills and add new ones that might be more useful. That’s the only way she—and workers like her—will continue to create value and stay employed.

3 THEY OWN THEIR DEVELOPMENT.

Because tomorrow’s workers are unlikely to stay at one job for their entire careers, they can no longer expect a single employer to direct them along their career development paths. What’s more, as the century wears on, more and more of them will be self-employed.

Currently, about 50,656,000 people—about one-third of all U.S. workers—are freelancers or contractors. A 2016 report from the McKinsey Global Institute concluded that between 20 percent and 30 percent of the working-age population in Europe and the U.S. engage in some kind of independent work. Many U.S. employers have indicated that they plan to increase their numbers of contingent or part-time workers in the coming years.

This means that both company employees and contract workers will need to make their own investments in their development and education. To do so, they should follow these critical steps:

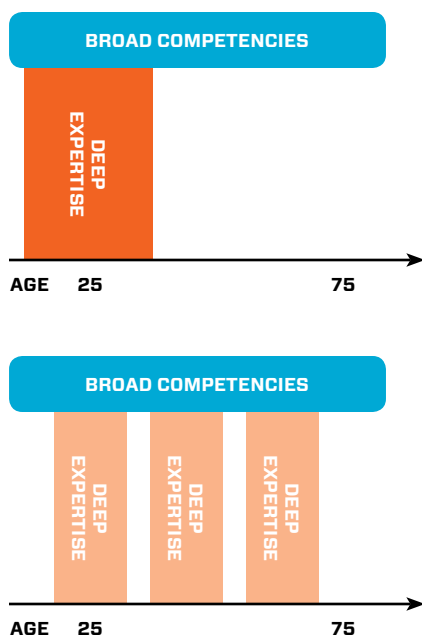
Create and execute learning goals.

They should ask themselves, “How can I ensure that I’m more valuable at the end of the year than I was at the beginning?” They should assess their competency gaps and focus relentlessly on their most important learning objectives, writes

strategy consultant Dorie Clark in a January 7, 2016, article in the *Harvard Business Review*. As she notes, too many people focus only on achieving quick wins instead of on gaining long-term competitive advantage.

Work with mentors and seek feedback. They should look inside and outside their companies to find mentors who will offer guidance and model positive behaviors. They always

Knowledge Profile



In the past, a manager might develop a T-shaped profile of knowledge—a broad general business understanding complemented by deep expertise in one subject. But tomorrow’s workers will need to develop M-shaped knowledge profiles as they supplement their general knowledge with a series of deeper skill sets.

Source of top graph: “The hunt is on for the Renaissance Man of computing,” by David Guest in The Independent, September 17, 1991. Source of bottom graph: Van Dam 2016.

should make it clear to various stakeholders—supervisors, peers, direct reports, and clients—that they are open to feedback that will help them improve their performance.

Measure progress. They should use learning journals or logs to track what they’ve learned that has been particularly valuable.

Make personal investments of time and money. In their book *Immunity to Change*, Robert Kegan and Lisa Lahey suggest that people who take ownership of their development will be able to answer the question, “What is the one thing you are working on that will require that you grow to accomplish it?” They also will be able to explain how they are working on it, who else knows and cares about it, and why this competency matters to them.

4 THEY STRETCH THEMSELVES.

Many researchers, including Andy Molinsky of Brandeis International Business School, have suggested learning only takes place when people move beyond their comfort zones and into learning zones where they acquire new knowledge and practice new skills. After they develop proficiency in these new areas, their learning zone becomes part of their comfort zone—and they can stretch themselves into a new learning zone once again.

When people are engaged in tasks within the learning zone, they are exposed to risk and stress. Harvard psychologists Robert Yerkes and John Dodson have proposed the Yerkes-Dodson Law, which finds a strong relationship between an increase in stress and the enhancement of performance—but only to a point. Beyond a certain level, an increase in stress can cause anxiety and have a negative impact on performance. Therefore, it is important for people to expand their comfort zones with the right new tasks and at the right pace.

One helpful tool is the S-curve model of growth and development. In business

terms, the S-curve explains how ideas and products spread through society—slowly at first, until the adoption rate reaches a tipping point, and then with mounting swiftness. The S-curve business model was developed in the 1960s, but in a September 3, 2012, *Harvard Business Review* article, authors Whitney Johnson and Juan Carlos Méndez-García explore how human learning follows a similar pattern.

Whenever people start new jobs or take on new responsibilities, they launch their own S-curves. At the beginning—as they learn about colleagues, stakeholders, processes, information systems, and organizational cultures—progress is slow and they have limited impact in their jobs. Then they reach an inflection point, gaining competence and confidence in their new roles, quickly accelerating their abilities, and having a progressively greater impact on the business. After they’ve been in their roles for a certain amount of time, they reach the upper flat part of the S-curve, losing the sense of excitement in the role, stalling out in their personal development, and reducing their impact on the business.

At McKinsey, we use the S-curve model to support our learning and development agenda, as well as the career progression of consultants and partners globally. We know that if people continue to stay in roles where they are no longer emotionally charged and motivated, their performance will stall.

We also know that a number of barriers might hinder them from stretching, thus preventing them from unlocking their full potential. For example, a low level of self-confidence can have a huge negative impact on a person’s ability to grow or learn. In his book *The Confidence Gap*, Russ Harris writes that low self-confidence can be caused by a combination of harsh self-judgment, excessive expectations, a preoccupation with fear, and a lack of experience.

To help workers build what we call “authentic professional confidence,”



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	FY 2013	FY 2014	FY 2015	FY 2016	Current/ATM	FY 2017 Est.	FY 2018 Est.
Market Capitalization	183,044.6	144,312.8	318,344.2	357,688.0	492,570.5		
Cash & Equivalents	12,447.0	17,438.0	19,808.0	25,981.0	21,531.0		
Preferred & Other	0.0	0.0	0.0	0.0	0.0		
Total Debt	6,889.0	16,089.0	17,539.0	20,410.0	21,599.0		
Enterprise Value	177,486.6	142,985.8	316,075.2	352,117.0	492,638.5		
Revenue, Adj	74,452.0	88,988.0	107,006.0	135,987.0	142,573.0	166,494.4	202,120.2
Growth %, YOY	21.9	19.5	20.2	27.1	25.7	22.4	21.4
Gross Profit, Adj	20,271.0	26,406.0	35,355.0	47,722.0	50,735.0	60,963.6	76,417.6
Margin %	27.2	29.7	33.0	35.1	35.6	36.0	37.8
EBITDA, Adj	4,010.0	5,094.0	8,514.0	12,302.0	12,849.0	19,299.5	25,180.4
Margin %	5.4	5.7	8.0	9.0	9.0	11.6	12.5
Net Income, Adj	1,854.4	-130.5	599.3	2,376.2	2,585.9	6,167.3	8,979.1
Margin %	2.5	-0.1	0.6	1.7	1.8	3.7	4.4
EPS, Adj	-0.28	1.26	4.91	5.33	12.14	17.27	22.27
Growth %, YoY	-	-	290.7	118.9	147.3	42.2	
Cash from Operations	6,842.0	11,920.0	16,443.0	17,012.0	17,012.0	-7,897.3	-8,993.6
Capital Expenditures	-4,893.0	-4,589.0	-6,737.0	-7,418.0	-7,418.0	-8,993.6	-8,993.6
Free Cash Flow	1,949.0	7,331.0	9,706.0	9,594.0	9,594.0	11,327.2	18,805.3



STEVENS MEANS INNOVATION



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McKinsey uses an emotional flexibility model in which we encourage people to practice mindfulness, define their purpose and values, commit to action, practice self-compassion, defuse tension, and learn acceptance. Armed with confidence, they can continue to stretch and grow throughout their careers.

5 THEY BUILD THEIR PERSONAL BRANDS AND NETWORKS.

We all create our own personal brands that differentiate us from co-workers and competitors. Key elements of a personal brand include a clear value proposition, a personal story, authenticity, expertise, consistency, visibility, and connections.

In their book *Leadership Brand*, authors Dave Ulrich and Norm Smallwood describe five steps people should take

to shape their brands: Determine the results they want to achieve in the next year, decide what they wish to be known for, define their identities, construct and test their personal brand statements, and make their brand identities real.

In the future, people will need to re-brand themselves multiple times during their careers as they develop different skill sets and play new professional roles. Many will earn additional credentials from online vendors such as Coursera, edX, Linda.com, and Udemy—all of whom offer digital badges that individuals can post on their social media sites. Thus, these badges become part of each individual's brand, and social networks become a way for workers to extend their brand reach.

Social networks also can be useful when workers are looking for jobs. In an

August 21, 2015, article in the *Financial Times*, John Gurskey of Melbourne Business School suggests that hiring managers often reach out to their professional networks before they even advertise a job opening.

In addition, social networks are valuable because they help individuals stay informed, make them more innovative, encourage them to learn new things, and act as sounding boards, says INSEAD's Herminia Ibarra in an April 18, 2016, piece in the *Harvard Business Review*. The most useful networks, write Karie Willyerd and Barbara Mistick in the book *Stretch*, are diverse ones filled with people who can provide different connections, insights, and career opportunities.

6 THEY DO WHAT THEY LOVE.

Apple visionary Steve Jobs once said, "Your time is limited, so don't waste it living someone else's life. ... And most important, have the courage to follow your heart and intuition."

People will spend eight or more hours a day at work for the 40 or 50 years of their careers. It is essential that they do what they love, because work has such a huge impact on their health and well-being. In his book *What Makes Life Worth Living?*, Gordon Mathews of the Chinese University of Hong Kong describes the Japanese concept of *ikigai*, which translates to "a reason for being" or "a life worth living." It encompasses all elements of life, including work, hobbies, relationships, and spiritual beliefs. Mathews believes that when people discover their *ikigai*, they find satisfaction and meaning in life.

But *ikigai* can be even more powerful. In a 2008 article in *Psychosomatic Medicine*, Toshimasa Sone and co-authors studied more than 43,000 Japanese adults and found that the risk from all-cause mortality was significantly higher among those who did not find a sense of *ikigai*.

The Japanese believe that people can achieve *ikigai* by answering four questions, which can be found in the book

The Search for Meaning



The Japanese concept of *ikigai*—in which people determine what makes life worth living for them—can help individuals decide what kind of work they should pursue in order to be filled with passion and purpose. Source: *Ikigai* by Héctor García and Francesc Miralles

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“WHAT DO YOU LOVE? WHAT DOES THE WORLD NEED? WHAT CAN YOU BE PAID FOR? WHAT ARE YOU GOOD AT?”

Ikigai by Héctor García and Francesc Miralles: What do you love? What does the world need? What can you be paid for? What are you good at? Individuals will identify their *ikigai* at the intersection of these insights.

Not everyone will find *ikigai* at the workplace. For instance, one person might see work simply as a job; he is motivated by financial rewards and has the goal of buying material objects. A second person is seeking a career; she is motivated by the desire for success, and her objective is to achieve tangible milestones. But the person who considers work his calling will find it brings him *ikigai*. This person is motivated by the work itself, because it brings him deep personal satisfaction.

Although organizations have a great responsibility to provide a context for meaning, those who want to be satisfied in their jobs need to take steps to create a calling for themselves. Lifelong learners will constantly refine their skills as they look for new ways to stay engaged in and passionate about their work.

7 THEY STAY VITAL.

Finally, the most successful individuals will be those who make it a priority to stay healthy by paying attention to exercise, nutrition, relaxation, and sleep. Sleep is much more important for learning than many people realize. It has a huge impact on our ability to acquire and retain knowledge, and it also can affect attention, concentration, creativity, development of insight, pattern recognition, decision making, emotional reactivity, socio-emotional procession, and the ability to develop relationships of trust. All of these abilities are necessary for tomorrow's workers.

B-SCHOOL IN THE DIGITAL AGE

If lifelong education becomes standard operating procedure for the Fourth Industrial Revolution, business schools will have a tremendous opportunity to serve a wide variety of learners.

Undergraduates and graduates will need to develop solid digital and business analytics competencies, and they will expect to find the relevant courses as core parts of the business school curriculum. But in addition to polishing the skills that will help them work with machines, they will need to develop the competencies that are unique to humans, such as creativity, critical thinking, problem solving, teamwork, and the ability to influence others. Just as important, they will need to learn how to learn so they can continue to master new skills as needed.

Alumni will return to their alma maters when they want to upgrade their skills or acquire the expertise that will enable them to transition to new fields and stay employable throughout their careers. As the shelf-life of knowledge continues to decline, alumni will look for courses on the latest business knowledge.

Organizations will partner with institutions that can deliver the skills their employees need and want. In the future, organizations are likely to find that they can only keep the best employees if they create “learning cultures” that offer workers ongoing development opportunities.

Not all learners will be looking for two-year or four-year degrees. Some will want quick, just-in-time courses; others will gravitate toward short, stackable certificate programs; and others will look for convenient online or blended courses.

But every type of student will expect

business schools to deliver learning excellence. One way schools can achieve this is by designing programs that draw on insights from the field of neuroscience, which examines how people learn and change behavior. For instance, we know that all learning has an emotional base; focused attention is key; spacing, repetition, and sequencing of knowledge accelerate memorization; active engagement of the learner is a necessary condition for learning; and a person's ability to learn is improved by sufficient sleep, healthy nutrition, and mindful practices. Other learning research suggests that students learn best in flipped classrooms where they collaborate in teams, process new knowledge, and practice skills. We also know that learning excellence is facilitated by faculty who create stimulating learning environments, provide personalized mentoring, and deliver inspirational classes.

If business schools don't offer the environment and the opportunities that learners want, all of these learners will look for alternate educational providers. Like corporations and like workers themselves, business schools must be prepared to adopt rapidly changing technology, adapt to economic disruptions, and reinvent themselves as needed if they want to prosper during the 21st century of work. **□**

Nick van Dam is partner, the Global Chief Learning Officer, and a client advisor at McKinsey & Company; he is based in Amsterdam, the Netherlands. He is an adjunct professor in the executive doctoral program for chief learning officers at the University of Pennsylvania in Philadelphia; he is also a full professor of corporate learning and development at Nyenrode Business University in Breukelen, the Netherlands. He serves on the corporate advisory board of edX and is a board member of AACSB and ICEDR, a global HR consulting firm. He is founder of e-Learning for Kids, which provides free digital learning to elementary school children.

Innovation, Engagement, Impact. **HAUB HAS IT**

Saint Joseph's University's Haub School of Business has partnered with the United Nations. In collaboration with Principles for Responsible Management Education (PRME), Haub introduced a new data analytics tool to capture, measure and report globally on how business schools are fulfilling the UN's Sustainable Development Goals. Achieving these 17 goals will promote prosperity for people and planet by year 2030.

For more information, visit [sju.edu/arrupe](https://www.sju.edu/arrupe).

DEFYING DISRUPTION WITH DIFFERENTIATION

UC Berkeley's Rich Lyons reviews today's disruptors to higher education—and tomorrow's strategies to keep business schools relevant.

WHAT FORCES ARE DISRUPTING the management education industry? How can business schools remain relevant when new technology and new competitors pose challenges from all sides?

We asked those questions of Rich Lyons, who has been in an ideal position to observe changes in the education market during the 11 years that he has served as dean of the Haas School of Business at the University of California, Berkeley. Lyons, who plans to step down later this year to return to the faculty at Haas, acknowledges that to stay relevant in the future, schools will need to take advantage of the innovations offered by the latest edtech. But he's also convinced

that only the schools that differentiate themselves—by the products they offer and the cultures they create—will continue to thrive in the face of all the forces that threaten to disrupt higher education.

What's one of the first things you think of when you consider disruptors to business education over the past ten years?

The emphasis on experiential learning has brought a fundamental shift to almost every business school, and much of the experiential learning has been brought about by the flipped classroom.

Here's a thought experiment. If we forced every classroom to be flipped,



if students in every class had already seen the professor's lecture, what would those classrooms look like? How would those courses be taught? What applied exercise or case study would be most useful? A thought experiment like that pushes faculty into a mindset of looking even further downstream in terms of teaching in the flipped classroom.

How is experiential learning incorporated into the curriculum at Haas?

About eight years ago, we decided that every student in the MBA program had to make at least one selection from a certain category of experiential learning courses. One is our Clean Tech to

Market class, or C2M, in which MBA students work with PhD students in chemistry, engineering, and other fields to do commercialization analysis on the basic science being created at the nearby Lawrence Berkeley National Laboratory.

But many other types of courses would qualify. Suppose a school ran a leadership lab in which students were required to practice ten of the actions that every leader must master. For instance, the lab would include a simulation in which students have to lay off employees—a task that is always difficult and that is ever-present in dynamic markets—while mentors observe and give them feedback. The mentor would make

comments like, “You lost eye contact. You didn't sound earnest. When you said one thing, it was understood a different way.”

There are so many possibilities that can be included in the category called experiential learning.

In many ways, the flipped classroom has been made possible by another disruptor—the digitization of content.

Lectures have become durable goods, and that shift has changed the very product we're offering. We're entering the era of “education-as-a-service,” which parallels the “software-as-a-service” era in business.

In the “education-as-a-service” model, students can reconnect with their schools virtually to take advantage of ongoing educational opportunities. But does the ease of attending a virtual campus disrupt the value proposition of the brick-and-mortar university?

I think the flexibility that digital delivery gives people is really valuable, especially for working professionals who are already at the limit of what they can juggle in their lives. But it's always valuable to have people come to campus. That's one of the things we've learned. It's hard for a 100 percent digital educational experience to capture some of the important relational elements. Many of the schools that offer online MBAs still bring people together at the beginning to build relational capital on the front end, and that capital is useful throughout the program.

The digitization of content also has the potential to be a huge disruptor for schools that draw primarily from local markets. How can these regional schools continue to compete with top schools that use online programs to attract students from anywhere in the world?

Regional schools need to get even sharper in their own value propositions. They can make it clear that they have decades of relationships with all the firms in

“I SEE A TREND COMING TO BUSINESS SCHOOLS WHERE WE SEPARATE OURSELVES COMPETITIVELY BASED ON OUR CULTURE AND OUR VALUE PROPOSITIONS.”

the area and that they can provide job opportunities that other schools would have trouble delivering. But I think that sort of competitive response by local schools needs to be better articulated, and it will still be an upward battle for some of the players.

One way these schools can achieve competitive separation is by creating deeply integrated programs that feature real synergies and new content. They can start by assessing the assets they have. For instance, Berkeley is strong in STEM fields and it's in Silicon Valley, so our opportunities were staring us in the face.

Highly integrated joint degree programs are disruptors in the education market because they allow one school to offer a product other schools can't match. What has been your strategy for creating such programs at Berkeley Haas?

We've been asking, "How do we create deeper connections between business and STEM fields in ways that bring more benefits to society?" We just launched a dual degree program for undergraduates called Management Entrepreneurship & Technology, or M.E.T. It's a fully integrated program in which we're coding engineering and business into the brains of 19-year-olds at the same time.

We built in all kinds of synergies and launched brand-new classes specifically for this program. For instance, a senior executive at Google suggested a course on product management because he said that product managers—people who can drive a business and understand how it's going to evolve technically—are the scarcest human capital they have at Google. One of our alums suggested a course simply called "Lean," which integrates

the concepts of lean engineering with the methodology of lean entrepreneurship.

What other fields would work well for these kinds of joint business degrees?

We're considering how we might create something like the M.E.T. program in fields like chemistry, life science, data science, and health science. We could offer one suite of programs at the undergraduate level, and one at the MBA level.

I recently worked with the dean of the College of Chemistry to create a short video on my iPhone that we sent to all the chemistry freshmen, letting them know what courses they should take in the next two years if they wanted to graduate with degrees in both chemistry and business. In the past, we've had one or two people pursuing dual chemistry and business degrees, but we think we should have 15 or 20. We're already thinking about what kinds of courses we could develop for this subset of people and what kinds of connections we need to make with companies who would want their specific talents.

How can schools use these intensive joint degree programs to differentiate their offerings?

When we launched the M.E.T. program, one of our alums, Tim Campos, suggested we revise our admission letter to say, "Congratulations! You've just been admitted to Haas, and your M.E.T. mentor is Tim Campos, CIO of Facebook." We'd been talking about our admissions letter because many of the people we're trying to attract have also gotten into other terrific universities. By dialing them into the mentoring network right from the beginning, we can develop the M.E.T. brand and differentiate our product.

So one way business schools can survive the current disruptors is to differentiate themselves by the products they offer. How else can schools set themselves part in today's market?

I think they can do it by taking a stand on values. How can a school make its values distinctive in ways that its competition can't? Can it become distinguished by its culture? If you ask CEOs how much time they spend managing the culture of their organizations, you'd have a hard time finding one who would say less than 20 percent. If you ask deans and presidents of universities the same question, very few would say 20 percent or more.

I see a trend coming to business schools where we separate ourselves competitively based on our culture—where we put our value propositions forward in an intentional way. I think business schools increasingly will say, "We stand for this. Other schools stand for that." As soon as we've done that, we will have true values-based differentiation.

In the business school industry, we can consider the admissions process as roughly analogous to the hiring process at big companies. If you ask the leaders at big companies how they attract talent, many would say, "We create a culture where people want to work." They're also willing to say to applicants, "This isn't a good fit. We're not the right company for you." A school has to be willing to turn down applicants with 790 GMAT scores and 3.8 GPAs because they don't fit with the school's values.

At some level, I think this differentiation will be forced on schools because competitive conditions will become so intense. In a world where flexible, digital programs allow students to attend any institution, students will choose the institutions that stand for what they stand for and that instill in them a sense of purpose. ■

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BUILDING ON BLOCK CHAIN



By most accounts, blockchain will revolutionize the way organizations do, well, just about everything. How educators and students are keeping up with the technology's rapid development—and preparing for its future.

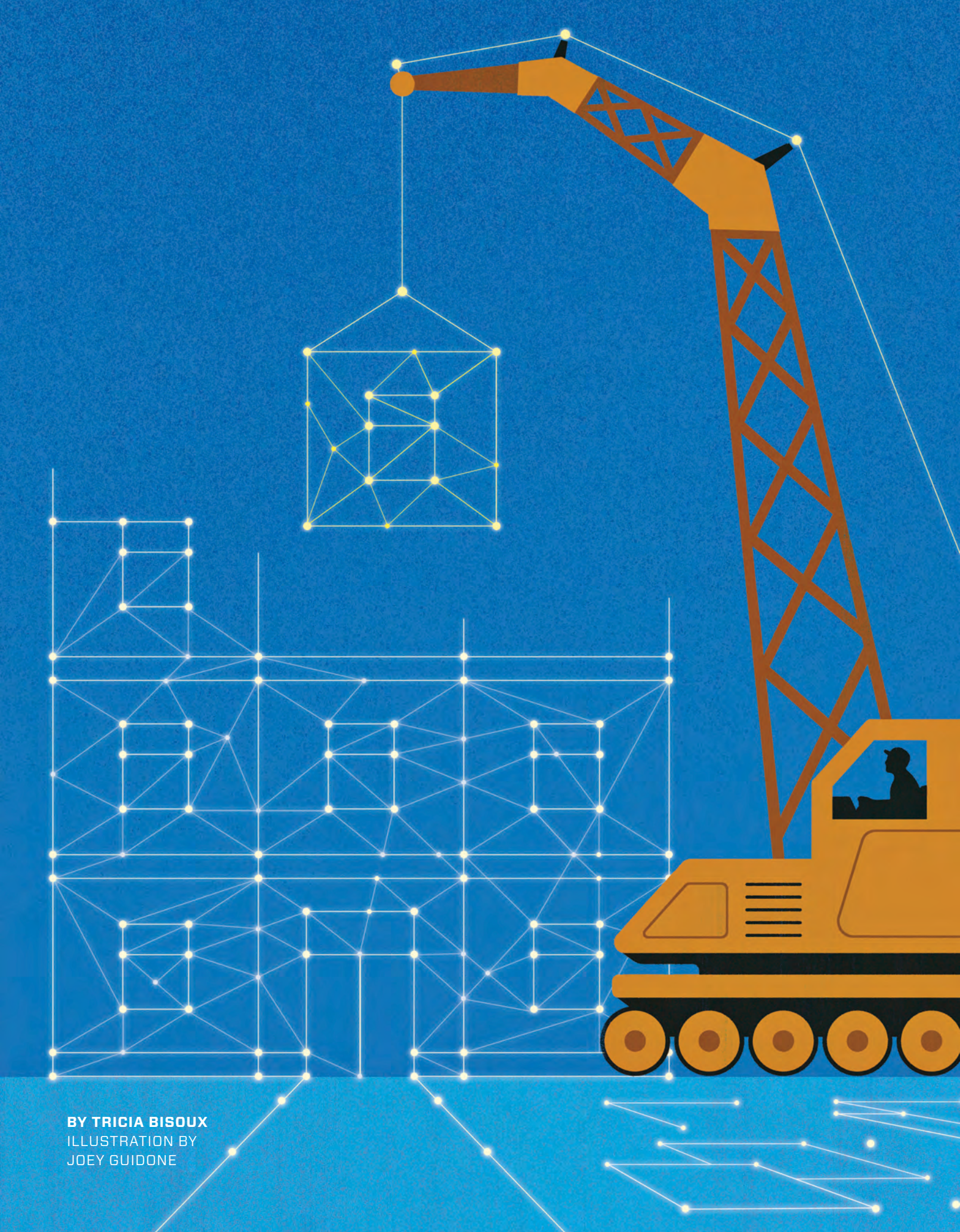
WHEN TODD TAYLOR FIRST HEARD of blockchain technology, he was working for IBM China. It was around 2013, and Taylor was part of a team conducting lab research on new ways to connect devices across the Internet of Things (IoT). One of the team leaders had heard of blockchain, a new technology for recording transactions securely in public digital environments. He suggested that it might be worth exploring for the project.

“The computer code for blockchain is open source, so we took the code kernel and fine-tuned it to record transactions between appliances with sensors and other connected devices,” says Taylor. In one experiment, the team used blockchain to connect a washing machine to a device that would deliver more detergent to the machine when sen-

sors indicated that its supply was running low.

Taylor is now a professor of practice at the W.P. Carey School of Business at Arizona State University in Tempe. As part of the ASU Blockchain Research Lab, he trains students to use the technology to automate any number of online transactions related to finance, government, healthcare, real estate, artwork, and, yes, IoT devices.

“Blockchain is still very new, and it’s changing rapidly at a pace we’ve never seen before,” says Taylor. “The students in our lab are working on how to scale blockchain in both public and private environments. They’re becoming familiar with the code bases, and some have now moved on to ask, ‘How would we do it differently?’ We’re trying to learn and absorb as much as we can.”



BY TRICIA BISOUX
ILLUSTRATION BY
JOEY GUIDONE

BLOCKCHAIN'S BEGINNINGS

Blockchain originated with a 2008 white paper by an unknown author or authors using the pseudonym Satoshi Nakamoto. The paper outlined a way to create a new kind of distributed database—a digital ledger that stores information across a network of computer processors. IT experts previously had suggested that distributed databases, a technology that had been around for two decades, could potentially be used to support the exchange of digital currencies. However, many were concerned that hackers could infiltrate networked databases too easily and manipulate their computer code to spend the same digital tokens more than once.

But the white paper, “Bitcoin: A Peer-

to-Peer Electronic Cash System,” proposed a solution to this “double-spend” flaw. It outlined the design of blockchain, a unique type of distributed ledger technology (DLT) that uses a special form of complex encryption to verify and record peer-to-peer transactions. The paper explains that blockchain would provide a system in which the encryption of each transaction, or block, includes a permanent record of all the transactions that preceded it. Hackers would be unable to tamper with the code for one transaction without affecting the data of all others that preceded it. Moreover, the encryption would be visible to all users in the system. This combination of complexity and transparency would make it impossible for hackers to guess or manipulate the code. (See “What Makes Blockchain Work?” on page 36.)

In 2009, the Nakamoto team built Bitcoin, the first public, decentralized blockchain database for the exchange of its new eponymous cryptocurrency. Once valued at less than US\$1, a single bitcoin was worth a record-high \$19,000 in December before falling to around \$10,000 in January. In 2013, a new player entered the game: Canadian Vitalik Buterin. Buterin was previously a recipient of a \$100,000 fellowship from Peter Thiel, who provides the funds to help innovative young people pursue alternative paths to traditional higher education. Buterin and his team wanted to take Bitcoin’s idea of a decentralized system for cryptocurrency one step further. They created blockchain code that would allow anyone to run self-executing contracts—so-called “smart contracts.” In 2014, Buterin and his team started a crowdfunding campaign to launch the Canadian startup Ethereum, an exchange for the cryptocurrency ether. When the first ether tokens were exchanged in 2015, each cost less than US\$1; today an ether token is worth more than \$1,000.

Together, Bitcoin and Ethereum have refined blockchain technology to the point that organizations in industries such as supply chain management, real

estate, and healthcare have recognized its potential to support automated peer-to-peer transactions. At the same time, companies such as IBM, Ernst & Young, and Deloitte, as well as a host of small startups, have developed blockchain-as-a-service products, which enterprises can adopt to create and test their own private blockchain platforms.

Universities, too, are taking part in ongoing research efforts. For example, at the ASU Blockchain Research Lab, computer science students are incorporating blockchain in their capstone projects and working on scaling blockchain in both public and private digital environments. In one project, students are using blockchain to connect devices and appliances in ASU’s Sun Devil football stadium. The integration of the blockchain network could streamline the way fans buy tickets, automate the way they order food, and even direct them to cheer based on feedback from sensors measuring levels of noise in the stadium.

The University of Toronto in Ontario recently opened the Rotman Financial Innovation Hub in Advanced Analytics (Rotman FinHub), where educators and practitioners can address challenges presented by financial technologies, or fintech, explains Andreas Park, associate professor of finance at Rotman and the University of Toronto Mississauga.

“The impact of blockchain is causing multiple seismic shifts across many industries,” says Park. “It’s all happening so rapidly that we’re struggling to integrate it into the curriculum in real time.”

A PROLIFERATION OF COURSES

Blockchain’s wide-ranging applications make it an exciting testing ground for teaching and learning, says ASU’s Taylor. Students in disciplines ranging from computer science and engineering to law, medicine, and business have started their own blockchain and cryptocurrency clubs and even have worked with faculty on independent study projects.

Now, they also have opportunities to enroll in a growing number of formal

Solutions to Scale

With all of its potential benefits, blockchain has a scaling problem. (See “What Makes Blockchain Work?” on page 36.) Computer programmers with ideas for solutions could be eligible for a research grant funded by Ethereum. Those interested can email their grant proposals to apply@ethereumresearch.org.

Proposals should include the official name of the project, applicant, and core developers; information about the team and past experience in Ethereum, blockchain, distributed ledger technology, mechanism design, or cryptography; a description of the proposal and its potential impact on scalability; a timeline to reach project milestones and completion; and an estimated budget and amount of the grant request.

► For information, visit blog.ethereum.org/2018/01/02/ethereum-scalability-research-development-subsidy-programs.

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courses in blockchain and DLT. One of the first was at Duke University's Fuqua School of Business in Durham, North Carolina, which has offered Innovation and Cryptoventures for the last three years. Taught by finance professor Campbell Harvey, the course requires that students earn the entirety of their grades based on an idea they develop for applying blockchain technology.

In spring 2017, the Massachusetts Institute of Technology's Sloan School of Management in Cambridge began offering an independent study and a revamped course in blockchain and DLT, on the heels of its own experiments with the technology. The school's MIT Digital Currency Initiative is developing a range of research on technology driving cryptocurrency platforms.

New courses in blockchain have launched this spring at the Stanford Graduate School of Business in California, the Wharton School at the University of Pennsylvania in Philadelphia, the Saïd School of Business at the University of Oxford in the U.K., and the Haas School of Business at the University of California, Berkeley.

At Berkeley Haas, Blockchain and the Future of Technology, Business and Law looks at the technology's potential impact on a range of industries. Co-taught by professors from the university's business, law, and engineering schools, the course can enroll up to 20 students from each school, who form interdisciplinary teams to work on blockchain-driven business plans.

Taylor of ASU is now teaching his first formal course in blockchain and DLT. Students with backgrounds in computer science will work with the code that drives blockchain and smart contracts, as well as learn the basics of creating cryptocurrencies. Business students who aren't trained as coders will advise the computer science students on when blockchain is—or is not—applicable to particular business database problems.

At Rotman, a new course on blockchain, taught by Park, will introduce stu-

What Makes Blockchain Work?

In a 2017 Deloitte report titled "Blockchain: Trust Economy," authors Eric Piscini, Gys Hyman, and Wendy Henry note that blockchain's rise reflects the public's growing willingness to make decisions based on online reviews and reputation, rather than more official forms of certification. The disruptive technology is a natural extension of the growing global trust-based economy, in which crowdfunding, ride-sharing, and home-sharing have become commonplace.

"The trust economy developing around person-to-person (P2P) transactions does not turn on credit ratings, guaranteed cashier's checks, or other traditional trust mechanisms," the authors write. "Rather, it relies on each transacting party's reputation and digital identity—the elements of which may soon be stored and managed in a blockchain."

It's blockchain's capacity for establishing and maintaining trustworthy digital identities that makes it so different from the traditional systems of oversight that exist today. It's a process of automated "smart contracts" that rely on three functions:

DIGITAL SIGNATURES Blockchain users each have a digital signature—an encryption key that is uniquely theirs—that follows them with each transaction they initiate. Each time it's linked to a transaction, this digital signature becomes part of the permanent digital record.

The use of these signatures has led to discussion about the creation of full-fledged digital identities, which would serve not only as user signatures, but as a way to verify identity. Called "self-sovereign identities," this information would be controlled by the user, rather than any third-party organization, and secured by blockchain encryption. Organizations dedicated to digital identity verification already exist. One nonprofit, the Sovrin Foundation, verifies identities via a global network of computers. Most individuals gain access through what Sovrin calls "trust anchors," which are recognized organizations that have relationships with the users and can provide identity-affirming information.

HASHES When participants initiate a transaction on a blockchain, that transaction—called a "block"—is converted into a data algorithm called a "hash." With each additional transaction, new information is linked to the data comprising the original hash (hence, the name "blockchain"), forming a permanent, encrypted historical record of all digital signatures and information related to each transaction.

Hashes are considered invulnerable to hackers for three reasons. They are permanent; once information is added to a hash it

cannot be changed, only corrected with another transaction. They are transparent and visible across the entire blockchain, so that any attempt to manipulate them is immediately apparent to all users. And they are so complex that hackers would need astronomical amounts of computing power to crack them—more power than is generally available in the world.

MINERS Once a user initiates a transaction, an alert goes out to individuals or entities known as blockchain miners. In cryptocurrency blockchains, for example, miners use special software to conduct what's called "proof of work." This refers to solving a complex mathematical puzzle related to each transaction—the solution essentially shows that the user's credentials reconcile with the hash. The first miner whose computer software solves a puzzle, allowing a transaction to go forward, receives a transaction fee in return. This makes blockchain mining profitable enough for startups with enough computing power to perform it.

Blockchain's underlying algorithms are incredibly complex, but they're also almost entirely automated, which would be a boon to efficiency in many industries. Many companies are experimenting with it in small pilot programs to test the technology's effectiveness and gauge the comfort of their vendors and customers. Last year, for example, a consortium of seven Canadian banks began testing the use of blockchain and digital identities to streamline services for their companies. Realtors are exploring distributed ledger technology to speed up transactions such as attaining title insurance and conveying deeds.

'Still in Its Infancy'

In practice, however, blockchain isn't ready for widespread adoption, because of four critical limitations:

It uses too much energy. Those who mine current blockchains make a profit, but they also must use very large computer systems, which require massive amounts of energy to run. "The amount of electricity that Bitcoin's blockchain uses is akin to that used by a small country," says Andreas Park of the University of Toronto. "Nothing we can currently do using blockchain comes close to the scale we need to sustain the level of peer-to-peer transactions that occur each day."

It's not scalable. Proof of work, via mining, is straightforward, but the number of blocks that can be processed in this manner is limited. Bitcoin, for instance, limits the size of any block to just 1 megabyte; but, to maintain security, the system deliberately makes the proof-of-work puzzles difficult enough that each one takes a miner ten minutes to solve. As a result, Bitcoin can process only seven transactions per second, on average; Ethereum can process 15 transactions per second. Visa, on the other hand, can process up to 24,000 transactions per second via more technological traditional means.

Blockchain researchers are looking into several possible solutions. One could be to use alternative computing languages or cryptography to reduce the amount of data distributed ledgers must store. Another would be to deploy a process called "sharding," which would save the information in a single database across many different servers, thereby reducing the amount of data any one server must store. A third solution could involve using a protocol that would conduct the bulk of transactions outside the system, or "off-chain," using blockchain only to confirm transactions in their final phase.

In early January, Canada-based cryptocurrency company Ethereum announced that it would offer outside programmers subsidies that range from CAN\$50,000 to \$1 million to help it solve the scaling problem. (See "Solutions to Scale" on page 34.)

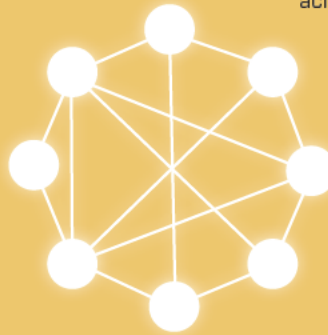
It can require too much capital. To work around scale limitations of proof of work, some companies are experimenting with a second protocol, "proof of stake," by which users can conduct transactions only to the extent that they have assets, or "stakes," in the system—those who commit fraud would forfeit their stake. To purchase a home that costs \$1 million on a blockchain platform, for example, individuals would have to have far more than \$1 million at stake as a disincentive to commit fraud. Their ability to use blockchain would be limited by the value of their assets.

It's not foolproof. Even though today's blockchain technologies are said to be unhackable, large-scale thefts still occur. In December 2017, hackers took 4,700 bitcoins, worth approximately US\$75 million, from the bitcoin exchange NiceHash by using the credentials of one of the company's own engineers to get into the system. Also last year, thieves stole a collective \$225 million from Ethereum users through low-tech phishing scams that tricked investors into sending funds to fake websites.

However, experts point out that such incidents have been due to the security failures of the users, not the technology. So far, no hacker has cracked any hashes on or stolen funds directly from a blockchain platform.

But adopting blockchain-based smart contracts in arenas beyond cryptocurrencies could be as much about changing mindsets as it is about improving the technology. Many people are still uncomfortable about relying on trust-based transactions without the oversight of some governing authority, says Park.

For all of the reasons stated above, "blockchain is still in its infancy," he says. "We're used to having firms controlling the process or governments setting the rules. But blockchain is a crowd-based system—a community—in which all participants make decisions based on consensus. They agree on the coding language to use, the protocols to follow. If someone wants to change it, there will be a discussion. For a change to occur, there must be consensus among users."



dents to the principles of blockchain and cryptography. Students in the course will use online blockchain simulators, which offer visual representations of blockchain transactions as they occur in real time.

They'll also explore how the large amounts of data exchanged across blockchains will become sources of input for cloud computing, machine learning, and artificial intelligence. "Blockchain will provide us with far more data that we can use to make better predictions about the future," says Park.

In addition, Park will familiarize students with initial coin offerings, or ICOs, in which startups are raising funds through the creation and sale of new cryptocurrencies, bypassing centralized financial systems. "An ICO costs next to nothing and takes half an hour to set up. Small firms don't need bankers, lawyers, or stacks of paperwork to be funded," he explains. "ICOs will put direct pressure on financial institutions to use public blockchain technology. They could be

the biggest trend to affect the career of anyone who plans to work in finance."

BIGGER THAN FINTECH

Many view blockchain as primarily a financial technology, but its implications for sectors such as healthcare and government could be just as transformative. In healthcare, for example, blockchain could secure patients' identities in ways that not only allow their records to be securely accessed by a range of providers, but also allow the data in those records to be donated to medical researchers to improve human health overall—all while protecting patient privacy.

Governments could use the technology to streamline their voting and benefit application processes. Countries such as China, Ecuador, Tunisia, and Senegal already have established their own national cryptocurrencies, with Russia, Sweden, Japan, and others announcing plans to launch their own. But perhaps no government has done more with blockchain than Estonia's. The target of a countrywide cyberattack in April

2007, Estonia and its leaders now rely on blockchain to offer greater security for its systems, including those related to citizens' identification, health, and voting records, as well as governance and small business registration. The country even has set up a system of "e-residency," in which noncitizens—especially entrepreneurs—can be issued digital IDs that allow them access to a limited set of Estonian governmental services.

As more nations adopt blockchain, the global regulatory environment will change dramatically, says John Jacobs, a former NASDAQ executive who helped launch a bitcoin-based exchange-traded fund. He is now with the Center for Financial Markets and Policy at Georgetown University's McDonough School of Business in Washington, D.C. At Georgetown, Jacobs explains, faculty and students are studying blockchain not just from the perspective of financial professionals, but from that of policymakers and regulators.

The center has partnerships with the D.C.-based Chamber of Digital Commerce, whose mission is to drive regulatory policy related to blockchain and DLT. With the chamber's participation, the center holds an annual national summit on blockchain. It also sponsors a blockchain incubator and works closely with Georgetown's McCourt School of Public Policy and Georgetown Law on research projects that explore the implications of DLT to the regulatory environment. These projects are looking closely into social issues surrounding gender and poverty—how, for instance, distributed ledger technology could provide the world's unbanked populations access to financial systems via mobile money platforms.

"When many people are first exposed to blockchain, the first thing they think of is bitcoin," says Jacobs, who is teaching his first course in blockchain to undergraduates this spring. "But the applications for distributed ledger technology go far beyond financial services. That's one reason we wanted to offer our

Learn More About Blockchain

Those who want to delve more deeply into blockchain and distributed ledger technology might start with the websites below:

Bitcoin.org – the site for the organization that created bitcoin, the first decentralized cryptocurrency.

BlockGeeks.com – a comprehensive resource about blockchain, developed by the founders of the Canadian cryptocurrency startup Ethereum.

blog.Ethereum.org – blog posts that explore issues related to the Ethereum Project, an initiative behind the creation of Ethereum and its cryptocurrency, which now is engaging in further development of blockchain technology.

blog.sweetbridge.com – a blog exploring the impact of blockchain hosted by Sweetbridge, a network of blockchain experts. Founded by Todd Taylor of Arizona State, Sweetbridge is now owned by Dash, an Arizona-based digital cryptocurrency company and a partner to the ASU Blockchain Research Lab.

e-Estonia.com – Estonia's online portal, which outlines its blockchain-driven solutions that are the basis of its governmental functions.

Sovrin.org – the site for the Sovrin Foundation, a nonprofit that allows individuals to verify and store their identifying information, which they then control to gain entry into public blockchain platforms.

first course at the undergraduate level, so we can explain what fintech, blockchain, and distributed ledgers are early on.”

Like Park, Jacobs is watching the ICO trend carefully. Currently, ICOs are unregulated, and many companies are making plans about ICOs based on the current regulatory environment. Those plans could be upended quickly once government steps in, Jacobs warns.

“Technology always moves faster than regulation and policy,” he says. “Our students need to anticipate what a future with regulation is going to look like.”

LIVING UP TO THE HYPE

With blockchain in such a state of flux, business schools can serve as hubs where organizations can access information, present problems for student projects, and exchange best practices

in blockchain development and deployment, says Jacobs.

“Twenty-five years ago, many business leaders didn’t yet understand the internet. They would have benefited greatly if business schools had told them, ‘This is how the internet is going to affect your companies,’” says Jacobs. “That’s what we’re trying to do right now, especially through our executive programs. We’re telling companies, ‘This is how blockchain works, and this is how it’s going to affect your organizations.’”

Business schools, too, must help business students develop good instincts and judgment that will serve them in fast-moving technological environments, says Park. “Students don’t necessarily need to know how to do the programming, but they will need to understand the logic, strategy, and

implementation of smart contracts and be able to ask coders to use the correct language for their enterprises.”

With so much attention being paid to blockchain by businesses and b-schools alike, many critics warn that the hype surrounding this emerging technology could be overblown. To them, however, Jacobs offers a nuanced response.

“If people think of blockchain narrowly in terms of just bitcoin or cryptocurrency, then, yes, it’s overhyped. But if they think of the overall applications of this unique technology to challenges across different organizations in many different industries, then they’ll see its potential,” he says. “I’m 58, and I tell my kids that if I was 28, I’d be all into blockchain. I honestly believe that, over time, it’s going to be as impactful as the internet.” □

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BY SANGEET CHOWFLA
ILLUSTRATION BY JOEY GUIDONE

THE SOUNDS OF CHANGE

Data from GMAC tells a compelling story about how today's students are asking for more choices and more innovation in graduate management education.

IF YOU'RE LISTENING, you can hear them: the distinct sounds of change emanating from the graduate management education (GME) community. They're the sounds of disruption, fragmentation, and segmentation, which so often are the precursors to innovation and regrowth. Within this rising noise, you can hear the voices of millions of people in emerging markets seeking the life-changing opportunities offered by management education—and demanding innovation in location, program design, delivery, and technology.

At the Graduate Management Admission Council (GMAC), we publish the Graduate Management Admission Test (GMAT)—but we also listen to the

market. We survey potential GME candidates, current students, alumni, and corporate recruiters to compile global statistics on who is pursuing management education and why. Our most recent numbers tell us that management education is both more popular and more fragmented than ever before. We assess that every year up to two million people enter the GME market, defined as postgraduate programs in management, business, commerce, or administration. Currently, candidates can apply to more than 16,500 programs and institutions.

We are finding that the business degrees that students pursue today vary depending on where they are in their own career life stages, what's happening in

the globalized economy, and what changes have occurred in the business cycle. The MBA remains the most sought-after graduate management degree, but it no longer represents the only path to success. GME is no longer “one size fits all.”

We believe this is a sign of revitalization in the GME market. It is an axiom of business that as markets mature, they segment; and as they segment, they niche. Therefore, the market forces a sharper focus on customers and their specific needs, and this is exactly what we are seeing in GME. At GMAC, we have an opportunity to view both student demand and institutional supply at the global level. Through this lens, we see three key points.

1 GLOBAL DEMAND IS UP FOR THE MBA.

According to our research, reports of the demise of the two-year full-time MBA are greatly exaggerated. It's true that there are declining application volumes in the U.S. and that some schools have shuttered their MBA programs. These facts lead some people to believe that the traditional MBA has run its course. They say the cost is too high, the ROI is uncertain, and the MBA will be replaced by shorter programs that produce job-ready graduates.

But we believe this conclusion is a misinterpretation of underlying trends. Globally, demand for the MBA is as strong as ever. A 2017 GMAC survey of 329 MBA programs showed that aggregate application volumes increased by 6 percent over the previous year. A separate study of alumni taken in 2017 showed that eight out of ten graduates rated their MBAs as excellent or outstanding. Furthermore, Net Promoter Scores—which subtract the number of “detractors” from the number of “promoters” of any product or service—were in the 50-point range for MBA programs. On both measures, U.S. schools led their European and Asian counterparts.

Why then the angst over the MBA? The short answer is that there have been changes in demand and supply.

choices of international students and an interplay of these forces:

Increased availability of quality education and jobs in other regions. In 2000, there were no Asian programs ranked in the *Financial Times* top 40. Last year, there were eight.

Negative perceptions about the U.S. as a study destination. Multiple surveys taken from the fall of 2016 through the fall of 2017 show that, since the Trump administration took office, four in ten potential students have reconsidered pursuing degrees in the U.S.

New programs that provide more choices. Recently launched programs in countries such as Germany, Spain, Singapore, and Japan are providing candidates with broader opportunities. Our application trends research shows that MBA application volumes grew by 3 percent in Europe, 6 percent in Canada, and 13 percent in Asia.

These shifts have driven significant changes in some MBA programs. For instance, in late 2017, the University of Iowa's Tippie College of Business in Iowa City announced it was closing its full-time two-year MBA program, a story that's been widely shared. What's been reported less often has been the growth in international programs. For instance, in 2015, Saïd Business School at the University of Oxford in the U.K. increased

accommodate the enrollment of 400 new MBA students within the next two years.

For every program closing in one part of the world, we routinely see new ones opening or expanding in other regions. At GMAC, our position is that the MBA is far from being in decline. Globally, growing numbers of students are pursuing MBAs. The question to ask is whether the traditional hegemony of U.S. institutions might be in peril.

2 DEMAND FOR FULL-TIME PROGRAMS IS REVERTING TO ITS SELECTIVE ROOTS.

Driven by brand, size, and rank, demand for MBA programs in the U.S. is showing great variation by institution. While overall application volume to full-time two-year MBA programs in the U.S. declined last year, applications to large programs with 200 students or more grew by 4 percent on the back of stronger domestic demand. There is a significant correlation between large class size and high rankings, and we conclude that students are signaling the importance they place on brand value. These larger, more recognized programs accounted for two-thirds of the total application volume in our sample.

Given this background, it's not surprising that some schools are changing the mix of their offerings. As administrators realize that they are losing out to competitors with broad national and international audiences, they are focusing instead on those that serve regional or functional constituencies—areas where they have competitive differentiation. This might mean they pour more resources into programs aimed at undergraduates, part-time students, or those interested in pre-experience master's degrees—which leads to our third point.

3 PRE-EXPERIENCE MASTER'S DEGREES ARE NOT SUBSTITUTES FOR MBAS.

These two GME degrees are not interchangeable, because they serve distinctly different market segments for

“ACCORDING TO OUR RESEARCH, REPORTS OF THE DEMISE OF THE TWO-YEAR FULL-TIME MBA ARE GREATLY EXAGGERATED.”

While global application volumes grew by 6 percent in 2017, applications to U.S. schools—44 percent of the total application volume—declined by 1.4 percent. Furthermore, applications to U.S. schools with class sizes under 200 declined by 11 percent. Those decreases are almost exclusively driven by the

its cohort of full-time MBA students by just over 40 percent. Within the past two years, Cambridge Judge Business School in the U.K. has increased its class size by 30 percent. In 2017, the Indian School of Business in Hyderabad admitted its largest class. And Fudan University in Shanghai is building a new campus to



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“THE MBA REMAINS THE APPROPRIATE CHOICE FOR MANY, BUT NOT FOR EVERYONE.”

students in different life stages. A pre-experience degree—also known as a master in management (MiM), an MS in management, or an MA in business—helps launch a career, while an MBA is designed to accelerate a career. GMAC research shows that MiM candidates are distinctly younger and have less work experience by an average of 3.5 years. They also start out at lower places in the corporate hierarchy—55 percent of them are in entry-level positions, while only 13 percent of MBA candidates hold such jobs.

Most telling is how they differ in long-term earnings. Over a period of 20 years, European MiM graduates earn less than their MBA counterparts by a cumulative €1.1 million (US\$1.28 million)—a difference of 48 percent. The gap is only 26 percent in the U.S., where master's degree programs tend to attract older, more experienced candidates. Our survey data shows that program satisfaction is also much lower for MiM graduates, only half of whom rate their experiences as excellent or outstanding.

It's also worth noting that nearly 20 percent of MiM graduates indicate an interest in going back to school at a later date. Globally, one in five candidates for graduate business programs holds a prior master's degree.

Taken together, these statistics offer an opportunity for schools to refine their marketing messages and use different tactics to target candidates at different life stages. Schools can promote the benefits of pre-experience MiMs to younger candidates, then approach them a few years later with information about the MBA or EMBA.

But the data also provide warning signals about the future of MiM programs. Historically, global demand for these programs has been anchored in two different demographics—domestic students in Europe who could attend schools all over the region after the Bologna Accord of 1999, and Chinese students who were interested in studying internationally. Numbers for the first group continue to hold steady, but they're dropping for

the second group as Chinese schools evolve and students choose to study in institutions closer to home. Between 2016 and 2017, applications to the same 160 master's programs that we surveyed had declined by 8 percent—largely due to softer demand from Chinese students.

We believe this is a harbinger. Over the past five years, the number of master's programs accepting GMAT scores grew by 24 percent, while the number of candidates sending GMAT scores to such programs declined by 18 percent. These two sets of indicators may be signaling that supply of such programs is exceeding candidate demand for them. This could be a warning sign for schools rushing to introduce new programs.

‘CENTURY OF THE INDIVIDUAL’

One longtime observer of the management education market is Dipak Jain, former dean of the Kellogg School of Management at Northwestern University in Evanston, Illinois, and current director of the Sasin Graduate Institute of Business Administration at Chulalongkorn University in Bangkok, Thailand. When Jain spoke at a recent GMAC conference, he discussed historical changes to the business world that have shaped and will continue to shape management education. He described the 19th century as the era of the nation-state and the 20th century as the era of organizations. He then predicted that the 21st century will be the century of the individual and the entrepreneur.

Business schools don't need to teach every student to be an entrepreneur. But we in the graduate management community need to think like entrepreneurs. We need to stay very close to the market, recognize when and how quickly to adapt curricula, understand the needs of the individual, and continue to evolve program offerings.

Above all, we must be sensitive to market shifts and be prepared to shift

with them. U.S. schools, which traditionally have been leaders in GME, currently face some of the most intense challenges as supply follows demand to the East. Many U.S. schools might have to choose between two extremes. They can develop a hyper focus on regional needs in terms of program content, duration, and career services. Or they can become truly global, perhaps by adopting the EMBA model of forging international partnerships where students immerse themselves in other cultures for extended periods. A generic middle ground may be unsustainable.

Schools around the world must continue to evolve. They must meet needs that are both global and local, must launch careers and accelerate them, and must adapt to the life stages of the individual. The MBA remains the appropriate choice for many, but may not be the right format for everyone. At GMAC, we are undertaking research that will help us understand candidates from a longitudinal perspective so that we can speak to them wherever they are in their career journeys. If one size no longer fits all, it behooves those of us in management education to segment offerings by candidates' life stages, define market positions, differentiate ourselves from the competition, and deliver value. After all, we teach our students to do the same.

We're listening to the sound of the marketplace talking and the sound of the future calling. ■

Sangeet Chowfla is president and CEO of the Graduate Management Admission Council (GMAC), an association of business schools worldwide and owner of the GMAT, NMAT, and Executive Assessment exams. GMAC is headquartered in Reston, Virginia, and has offices in London, New Delhi, and Hong Kong.

■ For a recent paper on the role of the master in management in global business education, visit gmac.com.



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THE **NEW** **FACES** OF MENTORING

TRADITIONAL MENTOR/MENTEE RELATIONSHIPS consist of veteran executives providing counsel and guidance to younger employees who want to succeed in their careers. But those traditional relationships aren't always as effective for women, minorities, younger employees, and workers from outside the U.S. Here, two professors examine why mentoring is important, how nontraditional mentoring works—and why alternative paths can sometimes be the best ones to follow.

MENTORING FOR DIVERSITY

Learning how mentoring relationships work by studying commonalities and differences across cultures.

BY AARTI RAMASWAMI

Do you have a mentor?

Often when I ask students or executives that question, I get puzzled looks from people who are confused about what a mentor is. Unless people have been formally paired with mentors in the past, many find it hard to recognize that mentoring can come in various forms and sometimes may not even be identified as “mentoring.”

In my own career, I have had a wide range of mentoring experiences. Having been mentored by professors and professionals in both India and the U.S., I have seen firsthand the commonalities and differences in these relationships across cultures. This has sparked my interest in understanding mentoring models to determine why some situations are positive and why some are not.

MENTORING AND ITS BENEFITS

To be able to explain to individuals and organizations why mentoring is so important, I often first must explain what it is. Mentoring is an intense reciprocal development relationship that traditionally is fostered between a senior, more experienced individual and a junior, less experienced individual. Another form of mentoring can be found in peer or buddy programs, which schools and organizations use to help socialize and coach students or employees.

In business settings, mentoring fosters employee development, which

helps companies improve quality, retain key workers, and meet the challenges of a complex global workplace. Mentoring also helps create a developmental culture within the organization, which again influences employee commitment and retention.

The vast research on mentoring suggests that it is associated with subjective and objective indicators of success, including salary, promotion, career satisfaction, and work-life balance. Indeed, mentoring can influence the three key levers of job performance and career success: ability, motivation, and opportunity.

Mentor support for protégés is typically classified under the two broad categories of career support and psychosocial support. As career supporters, mentors help mentees build their competencies and their networks by acting as coaches and sponsors, providing challenging assignments, and exposing protégés to high-visibility professional situations. As psychosocial supporters, mentors serve as role models and provide acceptance, confirmation, friendship, and counseling. These interactions help mentees become more efficacious at work, clarify their professional identities, and determine their career paths.

In my own research with George Dreher of Indiana University Bloomington, we show how mentorship—and

its various components, such as sponsorship, coaching, and role modeling, for example—can result in five broad positive outcomes. It enhances mentees’ *human capital*, thereby improving their job performance. It enhances their *movement capital* as they learn about job opportunities. It enhances their *sociopolitical capital* and signals to key decision makers that they fit the job and the profession. It gives mentees *path-goal clarity* by helping them understand how to realize their career aspirations. Finally, it enables mentees to gain *values clarity* by reflecting on their professional identities and their career goals.

MENTORING FOR WOMEN

Mentoring can enhance career success for anyone, but it might be especially important for women in traditionally male-dominated industries. Mentoring can help women attain their highest professional goals and can help organizations fully leverage their diverse talent. In my research, I’ve observed that senior-male mentors have a stronger positive influence on the salary and career satisfaction of female protégés than on male protégés.

But not all women—and not all cultural groups—benefit the same way from mentoring. For instance, in studies I’ve conducted with managers and professionals in Taiwan and the U.S., I’ve found that gender, marital status, and



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“Mentoring is a two-way process that benefits mentors and mentees.”

cultural values have different associations with mentoring in different cultural contexts. More specifically, being married led to more favorable outcomes for female mentees in Taiwan than in the United States.

I also have studied the differences between mentoring dynamics in India versus those in the United States. I found that the Indians in my sample generally had a strong preference for informal mentoring and that the mentoring experience was likely to involve some family-related activities that fell outside of work. Most interestingly, I found that younger individuals in India preferred more egalitarian relationships, rather than those that were paternalistic or hierarchical.

Other differences emerged. For instance, in both the U.S. and India, gender similarity was positively linked to mentor support—that is, when mentor and mentee were the same gender, outcomes tended to be more positive. However, this link was stronger in the Indian sample. On the other hand, commonalities in interests and hobbies were more positively linked to mentor support in the U.S. than in India; that was also true for perceptions of similarity in attitudes, values, and personality. Anyone attempting to set up a mentoring program must keep in mind that its success will be greatly affected by the extent to which it incorporates cultural factors.

THE ROLE OF THE B-SCHOOL

Business schools can help their students set out on a lifelong path of seeking and providing mentorship. While many MBA programs assign mentors to their students, schools often could do more by encouraging students to seek out mentors and sponsors even outside the formal program. Furthermore, the career services center could capitalize on the school’s alumni base to provide a diverse range of role models, career coaches, and industry executives who are willing to act as mentors.

At ESSEC Business School in Cergy, France, and Singapore, students in the Global MBA program are paired with experienced executives from the students’ professions or industries of interest. We believe it’s particularly important to invest time in matching mentors to students. Specifically, we want to understand the career needs and aspirations of the student and the motivations of the mentor. We want to know about any prior mentoring experiences either has had.

We also want to know the cultural norms the participants are most comfortable with. Some students might prefer to be in the same cities as their mentors; others look for mentors in the locations where they want jobs. Some students and mentors are comfortable having mentors and protégés from other countries, who don’t speak their native language, and who are living in different but manageable time zones. Other students and mentors are vocal about their desire to be paired with someone who lives nearby and speaks their native language, as this helps them build rapport and establish trust more quickly.

While no one can guarantee a perfect match, we aim to ensure one that is

mutually agreeable to all parties. We emphasize that having an open mind and allowing time for the relationship to develop will prevent the pair from judging each other too quickly. We have found that in mentoring pairs that work well, students and mentors take the time to openly discuss what they hope to gain from the experience, how often they will communicate, what communication modes they will use, and how they would like to drive the process. They must discuss and set expectations right from the get-go.

At ESSEC, we believe that the mentoring relationship is a two-way process that benefits mentors as well as mentees. Students develop insights into their career prospects and opportunities as their mentors help them define their professional directions and build their professional networks. Mentors gain skills in cross-cultural leadership, while honing their coaching and communication abilities. Furthermore, mentors not only have the opportunity to impact future leaders, they also get the chance to take the pulse of a new generation of leaders and to understand how they think, what they feel, and what they want to do. For these reasons, all parties—mentors, mentees, schools, and workplaces—benefit from strong programs in mentoring.

Aarti Ramaswami is associate professor in the management department at ESSEC Business School in Cergy, France. She is also academic director of the Global MBA.

► **Information about the research referenced in this article can be found at aarti-ramaswami.faculty.essec.edu/publications.**



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THE POWER OF PEER MENTORING

Peer mentors are especially important for building diverse workforces, but their potential remains largely untapped.

BY AUDREY J. MURRELL

While mentoring is a powerful tool for developing all individuals and leaders, it can be particularly useful in supporting diversity and inclusion. Research shows that individuals who have access to mentoring will experience better career and personal outcomes. However, we often only focus on traditional one-to-one mentoring where a more experienced or higher-status individual shepherds along a less-experienced mentee. While these traditional or hierarchical mentoring relationships have benefits, more diverse mentoring approaches can have an even broader impact. Peer-to-peer mentoring can be especially useful as organizations become less structured and more networked, flat, and dynamic.

Peer or lateral mentoring relationships are valuable for four reasons. First, peers can provide job-related and technical knowledge, much of it learned from personal experience; this is the kind of knowledge that usually is not covered in the formal material distributed within the organization or by a traditional mentor. Second, peer mentoring relationships suit the expectations of millennials and emerging generations who have less traditional views of position, status, power, and hierarchy. Third, if traditional mentors are lacking, peers can be used to fill the gap. Finally, peers often are more readily available and accessible than traditional mentors. This

is particularly important for women and people of color who frequently report not having access to mentoring within the organization.

Women and minorities can particularly benefit by seeking out mentoring relationships with three types of peers:

Informational peers. These mentors provide career advice as individuals learn the organization, develop their knowledge, or prepare for leadership roles. These peers are important not because of their titles or status within the organization, but because of the knowledge they possess.

Throughout my own career, I have found these mentors to be some of my most valuable resources, especially whenever I've moved into new positions, departments, or organizations. My informational peers helped me learn about the organization and its culture and gave me a great deal of additional information that could not be found on the company's website and was not shared by a boss. Informational peers often reduced my learning curve, which accelerated my overall impact. And because I felt we were at an equal status within the organization, I felt less anxiety about sharing my lack of knowledge about certain things with peer mentors than I did with traditional mentors.

For instance, when I took on the role of associate dean for the Pitt Business undergraduate program at the Univer-

sity of Pittsburgh, a number of informational peers were extremely helpful to me during my transitional period. They provided support and knowledge about my new administrative responsibilities that I could not have gained through my previous faculty role alone.

Collegial peers. Unlike informational peers, who can be founts of knowledge, collegial peer mentors provide emotional support, share career-specific knowledge, and help individuals build crucial skills. Some of that social support and general career advice is similar to what individuals could receive from close friends and family members, but collegial peers also create opportunities for mutual support and mutual personal and professional development. That's particularly true when collegial peers are in similar roles or professions.

By turning to collegial peers, workers also avoid anxiety that could arise from sharing certain information with hierarchical mentors. For example, I have coached individuals who have told me that they are unwilling to disclose their skill development needs to hierarchical mentors because they feared that information would be used against them in future performance reviews. However, they felt a sense of trust and psychological safety with their collegial peer mentors, so they could seek advice without fearing that they would suffer negative future consequences.



“Special peer mentors provide a safe haven for sharing disclosures and working out difficult challenges.”

With collegial peers, it is often key to have some common bond within the relationship. This bond can come from sharing an industry, a background, or a certain type of experience, or it can be built along the lines of gender, race, age, family status, or career stage.

Whenever collegial peer mentors move into different roles, positions, and organizations, they can expand the professional networks for their mentees. One group of former MBA students told me that, while in the program, they formed a group called “share the candy.” They agreed to stay in contact as they progressed through their careers so they could provide support to each other and reach out if they came across opportunities that were good fits for anyone in the group. In this way, they formed a powerful network of collegial peers.

Special peers. These unique mentors develop strong interpersonal ties with their mentees, along with deep trust, a sense of bonding, and a personal connection. In these powerful relationships, mentors and mentees also develop more emotional intimacy and offer more personal disclosure than they do in other types of mentoring relationships. They build strong ties that take them beyond the one-way transactions that occur in networking-only relationships. It takes time to build great trust, and so most people will have only a few special peers throughout their careers.

Special peers can be tremendous buffers for lessening the negative experiences, problems, and conflicts employees encounter throughout their careers—and they can be particularly important for minorities or people of color. Based on research co-authored and I conducted with high-potential African American managers, it is clear that special peers can provide an “unusual mirror” for examining difficult issues that arise for diverse individuals within organizations. In my experience, special peer mentors provide a safe haven for sharing, disclosure, and working out the difficult challenges that individuals do not feel comfortable discussing in the traditional hierarchical mentoring relationship.

PROVIDING RESOURCES

Because mentoring is so important, Pitt Business recently launched a new initiative that uses a unique technology to connect students with our alumni worldwide. We provide background information, video training modules, and guides that enable both students and alumni to cultivate effective mentoring relationships. As part of this effort, we have deliberately included recent graduates to act as peer mentors for new students who may feel reluctant to reach out to experienced alumni. In addition, through our Pitt Business professional student organizations, we encourage peer-to-peer mentoring among current students as a potential source of special peer mentors.

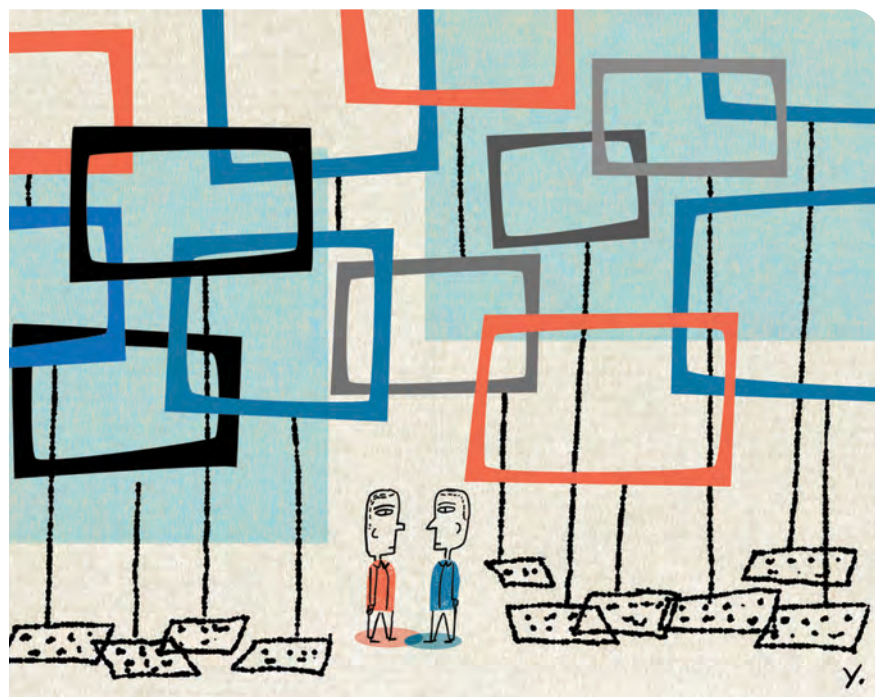
With students, I often share my personal story of how I remain connected to a number of peers from my undergraduate college experience so we can share information and provide personal and career support. Now some years later,

these individuals are in senior positions across all types of industries and organizations. These collegial peer-mentoring relationships have evolved from my undergraduate experience into a very powerful mentoring network.

Clearly, peer mentoring relationships offer a great and largely untapped opportunity for many rising executives and academics. Peers can discuss common dilemmas and challenges while they provide mutual learning and knowledge, and they can offer much more reciprocity than is usually found in traditional one-to-one hierarchical mentoring relationships. Peer mentors share information, give career advice, provide coaching about personal improvement, and direct each other to job opportunities, while they offer emotional support, feedback, and friendship. It is time to unlock the untapped power of these mutually beneficial peer mentoring relationships. ■

Audrey J. Murrell is the associate dean of the University of Pittsburgh College of Business Administration in Pennsylvania and is director of the David Berg Center for Ethics and Leadership. Her book Mentoring Diverse Leaders, co-authored with Stacy Blake-Beard, was published in March 2017 by Routledge.

■ The research referenced in this article, “Interorganizational formal mentoring: Breaking the concrete ceiling sometimes requires support from the outside” by Audrey J. Murrell, Stacy Blake-Beard, David M. Porter Jr., and Addie Perkins-Williamson, appeared in the Summer 2008 issue of *Human Resource Management*. It can be found at onlinelibrary.wiley.com/doi/10.1002/hrm.20212/full.



Putting Tech in Perspective

BY RICK NASON

The benefits of technology, both inside and outside the classroom, are great. But is educational technology crowding out learning? More specifically, is it crowding out the right type of learning—the type of learning that we need in our business schools more than ever?

There is no debating that technology has changed the business school experience in the last 20 years. As a former director of corporate training for two large multinationals in the 1990s, I had a front row seat for some of the most novel edtech innovations. Since then, internet tools have advanced the feasibility of MOOCs, and online training sites are leading some potential students to question the necessity of the university experience. At the same time, technology-based corporate training has become a growing industry that directly threatens and challenges business schools; just-in-time, on-demand training seems both convenient and effective—at least in the short term. Adding fuel to the fire, technology is changing the business of business schools, as well as the role of business professors, as more courses go online or are technically outsourced in the clamor for cost efficiencies.

In this pressure to compete, many professors believe that they, too, must adopt the latest in technology not only to teach more efficiently, but also to be current with the latest edtech advances. In this age of the digital student—and the digital campus—no professor wants to be seen as the analog Luddite.

But while technology makes lectures and whole courses *appear* more relevant,

Two Takes on Tech

WHEN IT COMES TO TECHNOLOGY, DO B-SCHOOLS GO TOO FAR OR NOT FAR ENOUGH? THESE PROFESSORS DISAGREE

HOW MUCH IS TOO MUCH when it comes to technology in the curriculum? What do employers value most in the digital age—the ability to navigate technology or the ability to think creatively? The two viewpoints that follow tackle both sides of these questions. On the one hand, argues the University of Michigan's Nigel Melville, organizations suffer when b-schools pay too little attention to technology. On the other, counters Dalhousie University's Rick Nason, if educators want to prepare graduates to manage the all-too-human aspects of business, they must keep technology's dehumanizing forces in check.

more exciting, and more energetic, we must be wary of the extensive use of technology for business education. In particular, we should be concerned about two fundamental and interrelated issues:

Technology's focus on fact over substance. The use of technology brings with it a bias toward emphasizing knowledge of facts rather than the intuition, nuances, and complexities of application and implementation. But we know that successful businesses are not run based on a set of discrete and immutable "facts."

Technology's dehumanization of the subjects we teach. Technology, by definition, dehumanizes subject matter, often subtracting the human element from business altogether. But business is all about human relations and interactions. For example, while many business leaders today have educational backgrounds in STEM disciplines, what sets the most successful among them apart is less about their knowledge of science or engineering, and more about their ability to implement their ideas through people.

The irony is that, if business schools are to produce managers for technology-driven, knowledge-based businesses, they need to dial back on technology in their classrooms. Only then will they be able to focus on human-to-human learning.

THE REALITY OF 'MAYBE'

As teachers, we might ask our students to take low-tech machine-graded tests or participate in enhanced, computer-based simulations. But for many such technologies, students proceed on the premise that they must provide a right answer or follow the right algorithm. The reality is that few real-world business problems have concrete and definitive answers. Business is a complex adaptive system, which produces patterns that are fundamentally unpredictable and stochastic.

In fact, the answer to business problems is almost always "maybe"—"maybe

this solution will work" or "maybe that one will work." Most business problems have multiple solutions; the success of any one of them relies on the flexibility and management of its implementation.

Technology and digitization are best suited for fact-based scenarios, with elements that can be codified. This makes the knowledge of immutable facts a very low-value commodity. Therefore, if companies valued our business school graduates only for their knowledge of facts, it's highly likely that those graduates would soon be replaced by more efficient managers of those facts—namely, robots or artificial intelligence. That would make the business school enterprise obsolete.

Luckily, we know that companies value our graduates for their ability to think, to learn, to question, to create, to take risks, and to deal with business environments governed by volatility, uncertainty, complexity, and ambiguity, or VUCA. To manage in VUCA environments, technology is vastly inferior. If business schools place too much of an emphasis on technology in their curricula, either implicitly or explicitly, they don't just devalue their own product. They also perpetuate in their students a bias toward factual knowledge rather than the ability to think.

UNSTRUCTURED, LOW-TECH LEARNING

It comes as no surprise, then, that one of the most successful teaching methods at my business school is decidedly low-tech. It's what we call an "unstructured simulation," in which student teams are asked to play a given role—for instance, a manager of a company, a member of the company's board, an executive from a potential acquiring company, a consultant, or an investment banker—and interact with one another in those roles over the course of two days.

For example, two years ago, we started one such simulation two days after Yahoo reported disappointing earnings results. For the simulation, we

assigned each team a role and provided it with a break-out room to act as its headquarters. With that, we allowed the situation to play out over two days with little or no direction from faculty. The only direction we provided them? To play the roles they were given as realistically as possible over the two days of the exercise. The students weren't even aware of the roles of other teams—they had to uncover this information as they networked as part of the simulation.

Initially, this kind of unstructured experience proves difficult for many students. They feel as if our instructions for these simulations are ambiguous, because they have no direction or rubrics for what they are to do. The simulation is not even associated with a specific class such as marketing or finance. But our student teams quickly come to embrace the challenge, creating a complex dynamic of competition and cooperation that closely resembles real-world scenarios. In essence, the student teams learn to make things happen—just as they will need to do once they graduate. Furthermore, they are assessed by a ranking from their peers—again, just as they will be after they graduate.

This approach is so simple and no-tech that outsiders almost always express skepticism that it could produce useful learning outcomes. However, both students and alumni tell us that this simulation is the most useful learning experience that they had during their MBA programs. One student noted that the simulation proved to be "much more intense, realistic, and complex than the classroom."

By comparison, we also take students through one or more of the popular computer business simulations. But when we do, we find that the students often spend more of their energies trying to reverse engineer the algorithm underlying the computer simulation, using practice rounds to estimate the equations and assumptions behind the models generating the simulation results.

It thus becomes more of a modeling exercise than an attempt to practice and apply business principles.

Unstructured simulations inspire creativity, risk-taking, questioning, critical thinking, and competitiveness. They require students to deal with ambiguity and develop an understanding and appreciation of complexity—skills that businesses say they want business school graduates to possess. Eventually, students acquire a wonderful and complex appreciation of what success as a business school graduate might entail. Moreover, unstructured simulations never inspire our students to ask the groan-inducing question that all good professors dread—namely, “Is this going to be on the test?”

EMBRACING THE HUMAN ELEMENT

At business schools, technology is an efficient tool for the conveyance of low-value, fact-based knowledge, which can help professors free up more of their valuable time and energy for teaching students about the human idiosyncrasies that make business so interesting. It also can be used to inspire students to think and create.

But no matter how advanced technology for education becomes, we should always view it as a tool to assist learning, not as a tool for learning. After all, if we as business school professors do not embrace the human elements of business, we will quickly be replaced by bots ourselves.

Rick Nason is an associate professor of finance at Dalhousie University's Rowe School of Business in Halifax, Nova Scotia, Canada. He explores the

*role of technology in business in his book *It's Not Complicated: The Art and Science of Complexity in Business*.*



Managing in the Fourth Industrial Age

BY NIGEL P. MELVILLE

DIGITAL TECHNOLOGIES ARE ENABLING remarkable innovations. Real-time spoken language translation, improved individual cancer treatments, reduced data center energy use, and smart robots that teach our children are all now realities. Pioneering companies are also thriving with digital tech. Tesla recently exceeded General Motors and Ford in total market value, and Amazon continues to use its advanced tech architecture to develop new products such as its billion-dollar cloud services business.

And this is just the beginning of what's to come, as invisible software networks begin to deliver superhuman intelligence to homes, offices, factories, and stores. At the January 2016 World Economic Forum, Pierre Nanterme, CEO of Accenture, emphasized that the effects of digital disruption present “the most significant threats and opportunities any of us have faced in business.”

Are business schools preparing their students to manage and lead in the era that Klaus Schwab has dubbed the Fourth Industrial Revolution? To answer this question, I asked a research assistant to examine the MBA core classes at the top 50 U.S. business schools in *BusinessWeek's* Best Business Schools 2015 ranking. From this analysis, I learned that roughly 75 percent of these schools do not have any tech management content in their core curricula, as either a separate class or a component of other classes. Top full-time international MBA programs show a similar lack of attention to tech content. Even tech-related elective offerings tend to focus only on a few narrow areas, such as big data.

These findings indicate that the majority of leading business schools do not require students to attain managerial tech competencies. This oversight has serious implications for organizations.

THE DANGERS OF IT UNCONSCIOUSNESS

We've already seen these implications made real in recent news headlines: A cybersecurity breach affected the security of millions of retail customers; an IT failure grounded an airline; political systems were hacked, raising uncertainty about electoral results. Information systems scholars who study such tech debacles often trace the root causes back to insufficient attention to technology governance, strategic planning, contractor and stakeholder management, project planning and sponsorship, resourcing and information governance, risk management, scheduling, and user involvement.

But all of these factors arise from a common source: managerial incompetence with technology. In a 2006 paper, researchers David Avison, Shirley Gregor, and David Wilson even coined a term to describe this failure: “managerial IT unconsciousness.” It refers to the disasters caused by managers leading tech projects without knowing what they don't know.

As organizations adopt more digital innovations, from autonomous software applications to data repositories that transcend devices, the situation is only getting worse. A minority of business schools have recognized this pressing opportunity by including such topics in core classes. What they teach highlights the three types of managerial tech competencies organizations will need in the digital age:

COMPETENCY NO. 1: TECH MINDSET

Managers who don't know what they don't know about IT suffer from unintended myopia. Managers with a tech mindset, however, overcome this myopia through a better understanding of the underlying features and trajectories of new technologies. They have the ability to ask and understand salient questions: *What are the strategic applications of new IT? In what contexts should we apply it? What is the difference between data, information, and knowledge? How can we use design thinking principles to envision new tech-enabled business models? What are the challenges and opportunities of artificial intelligence, and how can AI best be introduced in an organization?*

Business schools must develop curricula—with practical, hands-on exercises—designed to help managers develop tech mindsets that will help them explore such questions. Executives must learn to navigate the technological changes and new ethical challenges emerging in the Fourth Industrial Revolution, independent of specific digital technologies.

COMPETENCY NO. 2: TECH IMPACTS AND IMPLICATIONS

An equally critical managerial tech competency is the ability to understand the potential benefits, costs, and risks of new technologies. To develop this dimension, students must learn skills such as business case development and strategic alignment. They must be exposed to concepts such as the long tail and net-

work effects. They must know the latest theories, such as the platform-based competition theory posited by Geoffrey Parker, Marshall Van Alstyne, and Xiaoyue Jiang in 2017; the strategy triangle for aligning business, organizational, and digital strategies introduced by Keri Pearlson and Carol Saunders in 2013; and the energy informatics framework outlining the role that digital systems play in energy productivity developed by Richard Watson, Marie-Claude Boudreau, and Adela Chen in 2010.

Information systems scholars also have developed cases to allow students to explore these ideas in action. For instance, students could look at the case of a large organization considering an upgrade to its environmental management database to better comply with new environmental regulations. Through business cases such as this, students could learn how to assess risk, evaluate IT options, demonstrate value, develop a business case, and ensure that adopted technology aligns with organizational and business strategies.

COMPETENCY NO. 3: TECH GOVERNANCE

Tech governance refers to the effective management and development of technology through activities such as budget modeling, human resource management, vendor management, information lifecycle management, cybersecurity governance, systems analysis and design, and system implementation.

To develop this competency, students must learn concepts such as Liette Lapointe and Suzanne Rivard's 2007 alternative template theory of strategic tech implementation for matching managerial focus to implementation stage. They should also study Paul Tallon, Ronald Ramirez, and James Short's 2013 information governance theory addressing practices for robust data management. A practical example for students to explore would be the analysis of a firm considering a change to its tech budgeting model,

so that it can better align a new business strategy with its tech strategy.

WHAT CAN B-SCHOOLS DO?

Given what's at stake, it's critical that the 75 percent of business schools that don't include tech management in their core curricula do more to emulate the other 25 percent. They can begin by identifying existing curricular and extracurricular activities that expose students to managerial tech competencies. In this process, schools might not only find pockets of strengths on which to build, but also raise faculty awareness of potential opportunities to better serve their various stakeholders.

Next, business schools can assess the extent to which existing programs address the needs of students, alumni, recruiters, and other stakeholders. Finally, schools need to determine the best ways to address any gaps in their curricula. For example, schools might partner with digital pioneers to team-teach managerial tech competencies within required courses. A faculty member with expertise at the intersection of business and technology could co-develop a series of videos about a protagonist in the midst of a business transformation. Given the changing environment of higher education, b-schools themselves might need to apply internal tech capabilities to reimagine core activities such as student learning, faculty research, knowledge dissemination, recruitment, admissions, and curriculum development.

The vast majority of graduate business schools do not take managerial tech competencies seriously in their core curricula. It will be difficult for them to develop visionary leaders without addressing this immense opportunity. **D**

Nigel P. Melville is an associate professor of information systems at the University of Michigan's Stephen M. Ross School of Business in Ann Arbor.





Exit Boomers, Enter Millennials

STUDENTS DETERMINE WHAT DRIVES KNOWLEDGE SHARING

MEMBERS OF THE BABY BOOM GENERATION, which encompasses the 76 million Americans born between 1946 and 1964, are beginning to enter retirement. That leaves companies with a problem: How will they ensure that the knowledge of their most experienced veterans is passed down to incoming millennial employees? Siemens, a global manufacturing firm, has taken this question straight to a group of students at Clemson University's College of Business in South Carolina.

Kevin Yates, leader of Siemens' energy management division in the United States and Canada—as well as a 1994 Clemson graduate—was the one who decided to bring the real-world challenge to Clemson's Creative Inquiry program. Coordinated by the university's Watt Family Innovation Center, creative inquiries involve small groups of students spending a semester or more working on independent research projects under the supervision of faculty mentors.

In spring of 2017, assistant marketing professor Anastasia Thyroff and associate marketing professor Jennifer Siemens (no relation to the company) were tapped to recruit six students for this investigation of generational knowledge transfer. The topic was a timely one, Thyroff points out. According to a Pew Research Center study examining population estimates from the U.S. Census Bureau, 74.9 million baby boomers (51 to 69 years old) lived in the U.S. as of 2015, compared to 75.4 million millennials (18 to 34 years old). “The whole country is going to go through this,” she says.

The students' research revolved around three questions: First, what is the most effective way to transfer knowledge between seasoned and novice employees? Second, how can an organization implement this transfer across all of its divisions? Finally, what is the role of technology in this knowledge transition?

Students spent the first half of the semester learning to carry out marketing research, conduct interviews, run focus groups, and conduct ethnographic research. During the second half of the semester, students each identified someone from their personal networks who had either gone through a recent job transition or who was a recent retiree; they then traded names to interview each other's contacts.

These initial interviews prepared the students to conduct focus groups with Siemens employees over the summer, when they interviewed 41 Siemens employees who each had either less than five years or more than ten years of experience with the company.

Two members of the team were able to take an even closer look at the company. Siemens offered summer internships to seniors Tanner Parsons and Helen McDowell. McDowell worked in Siemens' marketing department headquarters in Atlanta, where she collected broad data about the company. Parsons worked at a branch office in Tampa,

Florida, where he observed the organic relationships that had developed among a group of seasoned sales engineers.

When students returned in the fall, they compiled the transcripts from their interviews with data collected by Parsons and McDowell into a 600-page document, which they analyzed for key words and themes. Last December, they presented their findings to 20 executives at Siemens' U.S. headquarters for energy management in Atlanta.

Among the students' recommendations? Hold social gatherings that encourage new hires and seasoned employees to socialize; treat interns like full-time employees to encourage loyalty to the company; and eliminate cubicles in favor of more open office environments.

These changes would facilitate organic mentorships, with mentors passing on knowledge to their younger counterparts—knowledge that can't always be typed up in a document.

"It's not as much about practical knowledge as it is about the tribal knowledge that these senior employees have from being here from ten to even 40-plus years," says Cris Higgins, head of human resources for Siemens' energy management, mobility, and building technology divisions. "I myself have over 20 years' experience, and trying to pass that knowledge on to another HR person is not accomplished with a one-time meeting. Not only do you have to transfer knowledge, you transfer your networking, you transfer your relationships, you transfer your know-how about how to get things done."

Yates views this student research project as "a model to closely look at across the rest of Siemens throughout the U.S." In fact, the work by these six students was only the first phase of what will be a three-year project for the company. This year, Thyroff and Siemens will assemble the next research team, who will build on the first group's findings.

Not Your Typical Ad Campaign

The best ad campaigns focus on what's special about their products. A new ad campaign designed for the Ted Rogers School of Management at Ryerson University in Toronto, Ontario, takes this strategy to heart.

The school wanted to highlight the fact that, as one of Canada's youngest business schools, it has a fresh and lively outlook on business. So it launched the "Not An Old Boy" campaign, which consists of print and video ads that feature diverse students and recent graduates who look like anything but the traditional three-piece-suit Wall Street mainstay. They sport T-shirts and tattoos and explain how their unconventional paths brought them to business school.

"To me, 'Not An Old Boy' embodies TRSM's open and accepting nature," says Sara Mohammed, one of the MBA candidates featured in the campaign (pictured in the ad below).

The "Not An Old Boy" campaign launched in September and will continue through the 2017–2018 school year. It was created by Bob Ramsay of Ramsay Inc., in collaboration with Paul Haslip of HM&E Design.

To choose participants to appear in the nine videos, the school worked with administrators in the MBA program to find students who had compelling stories to share. "Really, it was those students telling us about their experience with the MBA program that shaped the themes of the campaign," says Paul Cantin, director of marketing and communications. "They articulated so well our values of inclusiveness, diversity, and collaboration."

Videos have been posted online at a dedicated website and featured on the school's social media channels; banner ads link to the campaign on the school's homepage. Print versions appear in vehicles such as program booklets at

sponsored events. More visibility has come from large-format posters hung in the school's building in the heart of downtown Toronto. The school also planned to place posters across the city's subway system.

"Beyond that, we are using a network of digital screens in office tower elevators and walkways across Toronto," says Cantin.

For schools wanting to try a similar promotion, Cantin has this advice. "Trust that your students will have the best perspective on your school and what you have to offer. And have confidence that you cannot have better representatives of your brand than the students themselves. They will exceed your expectations! Our students are the best, and sharing their story is a pleasure and an honor."

▶ To see videos from the campaign, visit www.ryerson.ca/not-an-old-boy.

CHAMPIONS OF INDUSTRY

How can schools build better connections with industry? At the University of Wisconsin, one way is by capitalizing on strong ties with alums who are already out in the workforce. Pioneered by the School of Business but now run through the Wisconsin Foundation and Alumni Association, the Corporate Champions program targets companies that have a large number of alumni from all over the university. It identifies “champions” among those alums—usually recent grads who are full of enthusiasm—and works with them to plan events at the companies that will include all Wisconsin graduates who happen to be employees.

In addition to organizing the event, the school provides mementos that participants can put on their desks afterward to remind them of their connection to the university and to let others

recognize them as fellow alums. These might be tiny badgers—the school’s mascot—or replicas of the distinctive sunburst chairs that adorn the terrace at the student union.

By strengthening the network of University of Wisconsin alums, the Corporate Champions program benefits everyone involved, say school officials. Companies can more easily recruit and retain other graduates from the school, employees can connect with colleagues they might not have known were fellow alums, and “Champions” can make senior executives more aware of their leadership abilities. At the same time, the program is a way for administrators to keep track of alums who work within key partner companies—and sustain valuable relationships with relevant industries.

The Cybersecurity Game

STUDENTS AND STAFF are rarely as vigilant as they should be about cybersecurity, and that can be a problem for universities. To address that concern in a fun and memorable way, Florida State University ran a cybersecurity scavenger hunt last October on its main campus in Tallahassee as part of National Cyber Security Awareness Month. The campaign, sponsored by the university’s IT services department, used gamification to encourage individuals to take control of their digital lives and protect their personal information.

The game challenged participants to find, hidden around campus, abandoned laptops that had had the hard drives removed. On the screen of each of these laptops was a sticker that contained instructions and a unique URL for players to visit to answer a cybersecurity question.

When they answered correctly, they earned an entry into a prize drawing for an HP ProBook laptop. When they answered incorrectly, they were offered information about how mali-

cious cybercrooks can be. For instance, players were asked to consider the following situation:

The hunt is on! Time to jump online and see if you can snag some of those new night vision goggles that were just released. You:

- *Grab your debit card and start combing the web for the best deal.*
- *Settle on a webstore with “https” in the address bar and use your credit card.*
- *Find a new site and store your data for quicker checkout in the future.*

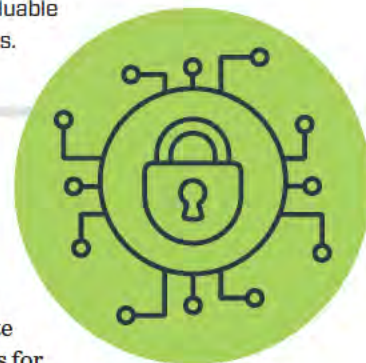
Participants who chose the middle answer learned that they had correctly identified the way to shop from a secure site with a low-limit credit card. If they picked either of the other answers, they were presented with information about why their answer was wrong and a description of a worst-case scenario.

For example, some participants received humorous responses such as, “Yikes! You also bought an Easy-Bake oven, plane ticket to Pyongyang, and zero-turn lawnmower. Looks like someone lifted your account info.” They then were

advised to use separate credit cards for online purchases and warned that they should be careful about where they save their credit card information online.

Just over 4,900 students and staff members participated in the contest. “We received a lot of great feedback and have a few ideas on how we can improve on the contest if we decide to do something similar in the future,” says Megan Del Debbio, marketing communications manager for FSU’s Information Technology Services.

And while the game was enjoyable, it had a serious message. “When you don’t practice good cybersecurity, you put not only your identity, but the whole university, at risk,” says Phil Kraemer, coordinator of security training. “People need to be aware of cybersecurity threats and take the right steps to protect their digital lives. And the laptop scavenger hunt is a fun way to learn that.”



tools of the trade

GAMES AND BEHAVIOR

Two economics professors at the University of Miami School of Business Administration in Florida have developed a mobile game that not only will entertain players, but also will offer researchers the opportunity to study interactive behavior in action. Blues and Reds, created by assistant professors Konrad Grabiszewski and Alex Horenstein, is a puzzle game in which, with every move, players must make a decision that will be more likely to result in their ending on a blue node. If they end a round on a blue node, they win and can move on to the next level; if they end on red, the computer wins and their play stops.

The game consists of 58 levels of puzzles to


solve. Each level offers a player just one "life," except for levels of play in what's called the Immortal Level.

What makes the game of interest to researchers is the fact that players who download the app provide their home country, age, and gender. As they play the game, researchers can identify which demographic groups make the most logical or illogical decisions in each interactive situation. Players who complete all 58 levels also are shown how well they performed compared to others in different demographic groups.

"The main objectives are to identify the percentages of users who are able to win levels in Blues and Reds and also to understand what determines these percentages," says Grabiszewski. "Addressing

these questions is important because it will allow scientists to develop better theories of interactive behavior."

Horenstein emphasizes that the popularity of gaming apps means that researchers have a tool to access, all at once, millions of people across all demographics, which will provide a rich new field of behavioral study. "Blues and Reds," he says, "is just the beginning of this new and fascinating chapter in social sciences.

Blues and Reds is available for iOS and Android devices. Visit www.bluesandreds.com. 



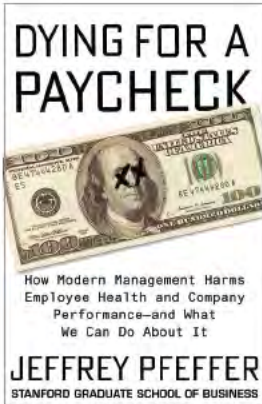
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DYING FOR A PAYCHECK

Management practices are the fifth leading cause of death in the United States, says Stanford’s Jeffrey Pfeffer in this deeply researched and unflinching look at workplace stress. Said another way, about 120,000 deaths each year can be attributed to ten stressful workplace conditions, including being unemployed, not having health insurance, working shifts, and having little decision-making power. While many employers institute wellness programs designed to help workers lose weight or stop smoking, the corporate focus is usually on lowering healthcare costs, not improving the lives of employees. “We need to change the language routinely used in business,” he writes. “Leaders should ensure that at the end of the day, their employees return home in good shape, prepared to live fulfilled lives outside of work.” (Harper Business, US\$29.99)

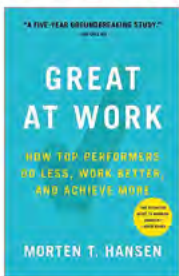
BIG MIND



As digital technologies become more pervasive, we’re seeing the rise of collective intelligence, in which technology enables and replaces human efforts. Geoff Mulgan—chief executive at Nesta, an innovation foundation in the U.K.—is concerned that we don’t have the right systems in place, in which case collective intelligence could harm humanity instead of helping it. He rejects the notion

that a networked world is automatically smarter and more organized. Collective intelligence, he says, “often has to be consciously orchestrated, supported by specialist institutions and roles, and helped by common standards.” For some of society’s grandest challenges, that means international cooperation—and, he warns, “we are a long way short of a truly global collective intelligence suitable for solving global problems.” (Princeton University Press, US\$29.95)

GREAT AT WORK



Why did explorer Robert Scott and all his men perish on their journey to the South Pole while competitor Roald Amundsen and his expedition triumphed? One reason was Amundsen’s narrower scope. He traveled only with sled dogs—the very best ones, carefully chosen—while Scott brought dogs, ponies, skis, and other transport modes, which diluted his focus. Amundsen had discovered one of the most important keys to high achievement:

Do less, then obsess. Morten Hansen of UC Berkeley isolates six additional principles that help individuals work smarter, not harder, which he defines as maximizing “the value of your work by selecting a few activities and applying intense targeted effort.” According to Hansen, work-smart practices account for

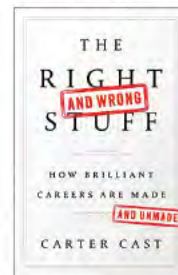
two-thirds of the variation in worker performance—even more than luck and talent. (Simon & Schuster, US\$29.99)

SURVIVE AND THRIVE



A business can be brought down by so many strategic threats: employee misdeeds, systems breakdowns, and disruptive innovations. In this collection edited by Joshua Gans and Sarah Kaplan of the University of Toronto, faculty at the school dissect high-profile disasters and propose measures companies can take to weather their own crises. For instance, Anita McGahan examines how healthcare costs led to bankruptcy at companies like GM, Kodak, and Xerox and advocates for a complete redesign of healthcare to mitigate risks for other companies. Gans and Kaplan sum up many of their authors’ recommendations: Through “structured anticipation,” they write, managers can understand their risks and build capabilities “to ensure that when threats materialize, action is possible.” (Dog Ear Publishing, US\$25.99)

THE RIGHT—AND WRONG—STUFF



Ambitious MBAs don’t always understand what personal characteristics might derail their careers, but Northwestern’s Carter Cast has a good idea. He describes five archetypes who are apt to self-sabotage on their way to the top, from the arrogant Captain Fantastic to the change-resistant Version 1.0 employee. “My research found that ‘a lack of self-awareness’ and ‘difficulty working with others’ were the top two reasons that ... one hundred people experienced a career derailment event,” he writes. He experienced just such an event himself and is ready to show others how to avoid it. (PublicAffairs, US\$28) □

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A view of Singapore, one of the world's "smart cities"

The Rise of Smart Cities

COORDINATING EFFORTS TO CREATE URBAN DIGITAL MECCAS

AS DIGITAL TECHNOLOGY becomes more advanced, urban areas around the world are looking into its potential to transform their communities into "smart cities," where systems of interconnected sensors streamline operations such as transportation, sanitation, and energy use. Last fall, two business schools announced their participation in comprehensive academic-industry partnerships, whose purpose is to make the smart-city aspirations of their own communities a reality.

A smarter Singapore. Nanyang Technological University has entered into a five-year partnership with National Research Foundation Singapore, the Agency for Science, Technology and Research (A*STAR), and the telecommunications company Singtel. Together, this group will dedicate S\$42.4 million (about US\$31.8 million) to create Singtel Cognitive and Artificial Intelligence Lab for Enterprises (SCALE@NTU). The lab will spearhead research and development efforts in emerging technologies to support Smart Nation Singapore, an initiative to help the country develop its digital infrastructure and economy.

SCALE@NTU will bring together 100 researchers to develop innovations in artificial intelligence, data analytics, robotics, and the

Internet of Things (IoT) that address challenges faced by large urban environments. One project will explore the use of smart sensors to analyze data from infrastructure facilities to determine the most cost-efficient maintenance schedules.

Other projects will focus on developing applications for areas such as public safety, transportation, healthcare, manufacturing, and urban development. The lab will train 200 research engineers, alongside graduate and undergraduate students, in the latest emerging digital technologies.

"Public-private partnerships and open innovation pave the way for successful projects that could benefit the Singapore economy and lives of Singaporeans," says Tan Sze Wee, executive director of the Science and Engineering Research Council at A*STAR. "In this age, where disruptions are emerging rapidly, such joint collaborations are all the more valuable."

AI in LA. The Marshall School of Business at the University of Southern California in Los Angeles has joined with other centers at the school to form a consortium that will design, develop, test, and deploy an IoT system that could benefit all communities, including Los Angeles. Other members of the consortium include the USC Institute for Communication Technology Management (CTM), the USC Center for Cyber-Physical Systems and the Internet of Things, and the USC Integrated Media Systems Center (IMSC) at the school's Viterbi School of Engineering.

The Intelligent Internet of Things Integrator (I3) consortium also includes ten participants from business and government. Among them are the City of Los Angeles; Verizon; and Avata Intelligence, a vendor that supplies "artificial-intelligence-as-a-service" to enterprises.

I3 will engage governmental agencies and industry partners to develop community-based IoT networks,

which are networks in which groups of independent citizens, companies, and other entities volunteer data from their devices to the smart system. This information then is consolidated into powerful data streams that businesses and municipalities use to improve their decision making and design new tools and services for their communities.

Such data could drive applications that manage energy use and air quality, coordinate transportation, streamline garbage collection, automate parking, or detect leaky pipes. Other applications could perform functions as simple as helping a restaurant increase its foot traffic or as critical as guiding firefighters through burning buildings.

For such a smart system to work, say consortium organizers, it must not only be protected from cybersecurity threats, but also allow individuals and communities to choose how and with whom they share their IoT device data. To that end, users of the I3 system will have the ability to assess trust ratings and evaluate incentives, such as loyalty or rewards programs, to determine with whom they share data.

I3's three co-founders include Bhaskar Krishnamachari, professor of electrical engineering, systems, and computer science at the Viterbi School; Jerry Power, assistant professor of clinical marketing and executive director of CTM; and Cyrus Shahabi, professor of computer science, electrical engineering and spatial sciences and the director of IMSC. Once the system has been tested, they expect to distribute the core system technology as open-source software that can be adapted by other cities and government agencies.

Marshall School dean James G. Ellis adds that I3 also will be a critical tool for "helping our students, faculty, and community better understand the convergences between businesses, consumers, and governments that will shape cities in this age of data."

DIVERSIFYING THE STEM POOL

The Association of American Colleges and Universities (AAC&U), an organization devoted to undergraduate liberal education, has received US\$4.8 million from the National Science Foundation to identify the STEM teaching methods that broaden the participation of low-income students. AAC&U's Project Kaleidoscope will lead a five-year professional development experience for STEM faculty and researchers seeking to pinpoint metrics for documenting undergraduate STEM teaching.

Quality teaching has been identified as one of the strongest and most consistent predictors of student interest in STEM, but teaching strategies continue to vary widely, the organization notes. Moreover, STEM faculty are not always provided with the professional development they need to understand how to integrate STEM education research and evaluation methods into their teaching strategies.

"This work represents a unique opportunity for aligning education research and evaluation with proven undergraduate STEM teaching practices that contribute to diversifying the STEM disciplines," says AAC&U president Lynn Pasquerella.

The professional development initiative interweaves face-to-face and virtual interactions through knowledge studios, regional clinics, and an online platform, creating a national community of scholars and practitioners.

► For information about Project Kaleidoscope, visit www.aacu.org/pkal.

Calling for Responsible Research

The Community for Responsible Research in Business and Management (cRRBM), a virtual global community of 24 senior business scholars from 23 universities around the world, has released a position paper that proposes ways that business research can contribute to a better world. The cRRBM is supported by AACSB International, the European Foundation for Management Development, Aspen Institute's Business and Society Program, and the United Nations' Principles of Responsible Management Education (PRME) group.

The paper imagines a future in which business schools contribute to societal well-being, help alleviate some of the world's most challenging problems, collaborate with business and governmental leaders, and produce research that is a model of "responsible science." The paper has gained the support of 84 co-signers, including scholars from 73 institutions in 21 countries.

The group invites business scholars worldwide to join the discussion. The goal, say cRRBM representatives, is to ensure that management research becomes a force for social change.

► Read the paper at rrbm.network/position-paper.

TRANSITIONS

Soumitra Dutta has stepped down as dean of the Cornell SC Johnson College of Business at Cornell University in Ithaca, New York. **L. Joseph Thomas**, a past dean of Cornell's SC Johnson Graduate School, will take over as interim dean. Dutta is also stepping down as chair of AACSB International's Board of Directors. Effective immediately, AACSB's board chair role will be filled by vice chair-chair elect **Caryn Beck-Dudley**, the dean of the Leavey School of Business at Santa Clara University in California. The role of vice chair-chair elect will be filled by **John Elliott**, the dean of the School of Business at the University of Connecticut.

Mickey A. Hepner is the new dean of Austin Peay State University's College of Business in Clarksville, Tennessee. He previously was dean of the College of Business at the University of Central Oklahoma in Edmond, where he also served as an economics professor. Hepner, who replaces interim dean **Charles Moses**, took his post January 2.

On January 1, **Rangarajan "Raghu" Sundaram** took up his new duties as dean of New York University's Stern School of Business. Sundaram, who joined Stern's faculty a little more than two decades ago, is the Edward I. Altman Professor of Credit and Debt Markets and professor of finance; he has been vice dean of MBA programs since 2016. He succeeds **Peter Henry**, who had held the deanship since January 2010.

Sibusiso Sibisi has been appointed director and head of the Wits Business School at the University of Witwatersrand in Johannesburg, South Africa. He began his new role in January. Sibisi previously was president and CEO at the Council for Scientific and Industrial Research and deputy vice-chancellor of research and innovation at the University of Cape Town.

Raj Devasagayam has joined the State University of New York at Old Westbury as the dean of the School of Business. He also will serve as professor of marketing. Before coming to SUNY Old Westbury, Devasagayam was the chair of the marketing department and director of the Center for Undergraduate Research and Creative Activity at Siena College in Albany, New York.



Rangarajan Sundaram



Sibusiso Sibisi



Thomas Froehlicher

Vincenzo Esposito Vinzi has been named dean and president of ESSEC Business School in Cergy, France. He previously was professor of statistics and dean of faculty at ESSEC. He succeeds former dean **Jean-Michel Blanquer**, who is now France's Minister of National Education.



Marc Rubin



Rami Maysami

Thomas Froehlicher has been appointed dean of Rennes School of Business in France. Froehlicher has previously served as the dean of Kedge Business School in France and HEC Liège in Belgium.

Marc Rubin has been named dean of the Farmer School of Business at Miami University in Oxford, Ohio. Rubin has served as the school's interim dean since last summer and has taught at the school since 1990. He has been the PwC Professor of Accountancy and previously served as chair of the accountancy department. He currently serves as the president-elect of the American Accounting Association and is a member of the AACSB Accounting Accreditation Committee.

The Aspen Institute has announced that **Daniel R. Porterfield** will become the next president and CEO of the institute, which is headquartered in Washington, D.C. He succeeds **Walter Isaacson** effective June 1. Porterfield is currently the president of Franklin & Marshall College in Lancaster, Pennsylvania, where he has served since 2011. In 2016, the White House named Porterfield one of 11 "Champions of Change for College Opportunity."

Rami Maysami is now serving as dean of the College of Business and Economics at California State University in Los Angeles. He previously was dean of the College of Business at Jackson State University in Mississippi. He also held academic and administrative positions at the School of Business at the University of North Carolina-Pembroke.

After more than seven years as dean of Auburn University's Raymond J. Harbert College of Business in Alabama, **Bill Hardgrave** became the university's provost and vice president for academic affairs in January. During his tenure as dean, enrollment increased by 47 percent and the college's endowment grew more than 230 percent, in part because of a US\$40 million naming gift from alum Raymond Harbert.

HONORS AND AWARDS

Nicole Tee, director of graduate studies at Nanyang Business School at Nanyang Technological University in Singapore, received the 2017 Bud Fackler Service Award from the Executive MBA Council (EMBAC) in October at its annual confer-



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ence. The award recognizes contributions to EMBAC and EMBA programs worldwide, including efforts to help other programs, to share best practices, and to raise the quality of EMBA programs.

African Women Educationalists (FAWE) of Nairobi, Kenya, has been awarded the 2017 Al-Sumait Prize for African Development in the Field of Education. The group was recognized for its achievements in enhancing gender equality and equality education through targeted programs, which have impacted attitudes toward girls' education and influenced education policies in 33 African countries. For information, visit www.alsumaitprize.org.

GIFTS AND DONATIONS

The **University of San Diego** in California has received a leadership gift of US\$20 million from former Clorox CEO Donald Knauss and his wife, Ellie. The gift will launch the construction of a new complex for the School of Business. The new facility will be located adjacent to the current building, which will be renovated once the new structure is complete. The final consolidated complex, which will be named for the Knausses, is expected to cost US\$67 million, encompass more than 120,000 square feet, and be completed in 2022.

New York University's Stern School of Business has established the Fubon Center for Technology, Business and Innovation, with the support of an US\$8 million endowment gift. The money was provided by alumnus Richard Ming-Hsing Tsai, chairman and CEO of Fubon Financial Holding Co.

Ltd., as well as by Fubon Financial Holding Co. Ltd. The center will serve as a hub for cross-disciplinary collaboration in research and course development.

NEW PROGRAMS

Northern Kentucky University in Highland Heights began offering an accelerated online MBA in January. The school is bringing 14 additional programs online by March, including a bachelor's in business administration with concentrations in general business, global supply chain management, management, and marketing.

This winter, the **University of Michigan—Dearborn's** College of Business began offering a new 15-credit information systems security minor as a response to the growing digitization of business data.

The Naveen Jindal School of Management at the **University of Texas at Dallas** launched its bachelor of science degree in human resource management in fall 2017. The degree combines business core classes with specialized training in human resource management.

The Bertha Centre for Social Innovation and Entrepreneurship at the **University of Cape Town** (UCT) Graduate School of Business in South Africa is offering a MOOC called Innovative Finance: Hacking Finance to Change the World. It is designed to give social entrepreneurs the financial tools they need to launch their organizations. This is the second MOOC from the Bertha Center, and the 11th

from the university, as part of a wider UCT initiative to develop open learning courses.

The School of Business at the **University of San Diego** in California is offering a new 11-month international MBA (IMBA) degree that allows students to study in multiple countries. International experiences include a required term in Spain; an international consulting project in Asia, Europe, or Latin America; and field trips to Mexico.

The School of Business and Economics at **Sonoma State University** in Rohnert Park, California, has launched a hybrid version of its Sonoma executive MBA in wine business. Offered over 16 months in both online and face-to-face formats, the program will be structured in three-month segments of online case-based learning and faculty mentoring. Between each online segment, the program will include four ten-day residential "leadership intensives" in California, France, and Australia.

Kedge Business School, which has locations in France and Asia, is launching two new MSc programs in 2018, one on corporate and sustainable finance and one on sustainable change, both to be taught in English. The MSc in corporate and sustainable finance will include materials that address investor accountability and examine impact factors in investing. The MSc in sustainable change will focus on teaching students how to create sustainable change within organizations and how to understand complex social, environmental, and economic ecosystems.

The Rady School of Management at the **University of California San Diego** has launched a master of professional accountancy degree that will begin in September. The 50-unit program provides key educational requirements for candidates seeking Certified Public Accountant licensure.

COLLABORATIONS

Grenoble Ecole de Management in France has partnered with the Glion Institute of Higher Education, a hotel management school in Montreux, Switzerland, to offer a dual MBA/MSc in international hospitality. The first intake will be in 2018. The program allows students to earn the double degree with one year of academic programming and an additional year of professional experience.

Startups and the Law

San Diego State University (SDSU) in California has partnered with the University of San Diego (USD) School of Law and international law firm Duane Morris LLP on a new initiative. Students from SDSU's Lavin Entrepreneur Center at the Fowler College of Business work with law students from the Entrepreneurship Clinic at USD School of Law to obtain legal counsel as they establish startup businesses. Licensed attorneys from Duane Morris oversee each transaction and provide transactional support for each startup endeavor. The program began in November. It will feature an annual Duane Morris seminar to teach students in the Lavin Entrepreneurship Program about the common legal pitfalls of startups. Additionally, Duane Morris will host legal clinics in its San Diego office several times a year to help students handle any legal issues that may arise, as well as offer general legal advice on their business matters.

Columbia Business School in New York City has collaborated with Columbia University's Fu Foundation School of Engineering and Applied Science to design a full-time joint master of science degree in business analytics. The three-semester program includes a capstone consulting project in which students will work on a real-world business problem.

NEW CENTERS AND FACILITIES

The **University of Toronto's** Rotman School of Management in Ontario has launched the Rotman Financial Innovation Hub in Advanced Analytics (Rotman FinHub) to develop initiatives in financial innovation across all the school's programs. The new hub will create new classes in topics such as machine learning and blockchain for the school's MBA, master of finance, and master of financial risk programs. It also will support faculty research, conferences and symposiums, and student scholarships.

Wits Business School at the **University of Witwatersrand** in Johannesburg, South Africa, has launched the African Energy Leadership Centre (ELC) to address issues of energy shortages in Africa, as well as the skills deficit of managers in the energy industry. The ELC will offer a post-graduate diploma, a master's degree in energy leadership, and executive education short courses and seminars.

Lynn Pippenger Hall, the 68,000-square-foot building that houses the Kate Tiedemann College of Business at the **University of South Florida** in St. Petersburg, has received Leadership in Energy and Environmental Design (LEED) Gold certification from the U.S. Green Building Council. Sustainable elements in its design include wood certified by the Forest Stewardship Council, materials sourced locally and regionally, and a management system to monitor energy usage.

OTHER NEWS

Dominican University's Brennan School of Business in River Forest, Illinois, has announced the Norman and Ruth Carroll Endowed Chair in Business and Economics. The chair, made possible by an anonymous US\$1.5 million gift, honors founding dean Norm Carroll and his wife.

The Lerner College of Business and Economics at the **University of Delaware** in Newark has launched two new programs, the Lerner Diversity Council, devoted to carrying out diversity initiatives, and the Women's Leadership Initiative, which promotes gender equity in the workplace.

Three universities have joined IBM as part of its IBM Q Network, which explores practical applications for quantum computing systems: **Oxford University** in the U.K., **Keio University** in Japan, and the **University of Melbourne** in Australia. □



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43%

The portion of Fortune 500 companies that were founded or co-founded by immigrants or children of immigrants, according to the Center for American Entrepreneurship.

READ "IMMIGRANTS ON THE FORTUNE 500" ON PAGE 12.



65%

That's how many people believe freelancers are happier than other workers; 26 percent have considered becoming one, says a study by ReportLinker.

READ "THE CONTENTMENT OF THE CONTRACT WORKER" ON PAGE 12.

SCHOLARSHIP FOR SOCIETY

The Community for Responsible Research in Business and Management has released a position paper proposing ways management education can create a better world. The authors call for more management research that addresses the world's great problems, provides guidance for business and governmental leaders, and contributes to societal well-being.

READ "CALLING FOR RESPONSIBLE RESEARCH" ON PAGE 65.

BIGGER THAN THE INTERNET?

"Twenty-five years ago, many business leaders didn't yet understand the internet. They would have benefited greatly if business schools had told them, 'This is how the internet is going to affect your companies,'" says John Jacobs of Georgetown University. "That's what we're trying to do right now. We're trying to tell companies, 'This is how blockchain works, and this is how it's going to affect your organizations.'"

READ "BUILDING ON BLOCKCHAIN" ON PAGE 32.

POWER PRINCIPLES

"Business schools have a responsibility to teach people what we know about human behavior. We should teach not just what 'should' be but what 'is,'" writes Stanford's Jeffrey Pfeffer. "If we want more instances of power being used for good, we need to ensure that more good people understand—and are willing and able to use—the principles of power."

READ THE OP-ED "POWER: THE 'REQUIRED' BUSINESS SCHOOL ELECTIVE" IN THE YOUR TURN SECTION OF BIZED.AACSB.EDU.

FLIPPING THE MODEL

"Lectures have become durable goods, and that shift has changed the very product we're offering," says Rich Lyons of the University of California Berkeley. "We're entering the era of 'education-as-a-service,' which parallels the 'software-as-a-service' era in business."

READ "DEFYING DISRUPTION WITH DIFFERENTIATION" ON PAGE 28.

STILL GOING STRONG

"Reports of the demise of the two-year full-time MBA are greatly exaggerated," writes Sangeet Chowfla of the Graduate Management Admission Council. "It's true that there are declining application volumes in the U.S. and that some schools have shuttered their MBA programs. ... [But] globally, demand for the MBA is as strong as ever."

READ "THE SOUNDS OF CHANGE" ON PAGE 40.



US\$390,751

The global average ten-year return on investment of an MBA, according to the QS TopMBA.com Return on Investment Report 2018.

SEE "MBAS ON THE RISE" ON PAGE 16.

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