Article

Prepared by: Caroline Shaffer Westerhof,
California National University for Advanced Studies

The Top 10 Countries for Embracing IT

ROBERTO CROTTI

Learning Outcomes

After reading this article, you will be able to:

- Describe the ranking criteria used by the Networked Readiness Index for the 2014 Global Information Technology Report.
- Discuss the factors that put Finland at the top of the world list for a second consecutive year.

Which economies are best placed to benefit from new information and communication technologies (ICTs), bridge the digital divide and extract value from big data?

The Networked Readiness Index (NRI), part of the 2014 Global Information Technology Report: The Risks and Rewards of Big Data, published today, ranks 148 countries for the quality of their digital infrastructure and ability to use ICTs to generate economic growth, foster innovation and improve the well-being of their citizens.

Here is a list of the top 10 economies making the most of the digital age, according to the NRI:

1. **Finland** tops the rankings for the second consecutive year, thanks to its outstanding digital infrastructure, which the Global Information Technology Report (GITR) says is the best in the world. With more than 90% of its population using the Internet, and with high levels of innovation, Finland is reaping the rewards of investing heavily in ICT in the mid-1990s, which it did in response to a financial crisis.
2. **Singapore** remains in second place in the NRI. Supported by a government with a clear digital strategy, which offers an ICT infrastructure that is relentlessly being improved, and the best online services and highest-quality education systems in the world, this city state has become a knowledge-intensive economy and ICT powerhouse.
3. **Sweden** stays in third place, reflecting its world-class yet affordable digital infrastructure and stable pro-business environment, despite high tax rates. These strengths have led to outstanding use of ICTs by individuals, businesses, and government, as well as one of the highest innovation performances in the world, making Sweden a truly knowledge-based society.
4. **The Netherlands** also retains its high ranking from the 2013 index. This service-based economy has quickly and skillfully recognized the importance of ICTs in boosting innovation and competitiveness. Information technology permeates all sections of society in the Netherlands, with nearly everyone able to access a computer and home Internet connection, and a large number of government services available online.
5. **Norway,** with a well-developed and affordable ICT infrastructure, sits in fifth place in the NRI. Digital uptake is almost universal among Norway's population: 95% are Internet users and more than 90% have access to a personal computer and Internet connection at home. In addition, the country benefits from a stable pro-business and pro-innovation environment and a government that is aware of the importance of connectivity for the economic and social development of a geographically vast nation with a widely dispersed population.
6. **Switzerland** benefits from an excellent, if expensive, ICT infrastructure and a strong education system that provides the necessary skills to create a knowledge-based, technology-rich economy. These assets, coupled with a stable political and regulatory environment and excellent conditions for innovation and entrepreneurship, have resulted in outstanding digital uptake and use by businesses.

7. **The United States** moves up two positions to seventh on the list, thanks to improvements in many areas of the index, including the country's already strong business and innovation environment and ICT infrastructure, notably in terms of wider access to international Internet bandwidth. Overall, the country has seen a robust uptake of digital technology by all major stakeholders, whether businesses, governments or individuals.
8. **Hong Kong** has shown the most pronounced improvement among the top 10, climbing six positions to eighth place. This has been driven by improvements in conditions for innovation and entrepreneurship, better skills training and increased use by both business and government. Hong Kong enjoys a well-developed infrastructure, and this has had a positive economic and social impact.
9. **The United Kingdom** drops two places from last year. Like the Netherlands, the UK was early in recognizing the importance of ICTs, especially to innovation and competitiveness, and as a result has become highly digitized, with a thriving e-commerce environment. This, coupled with a pro-business approach, has had wide-ranging economic and social benefits.
10. **South Korea** moves up one position and enters the top 10. A country that has based its economic success largely on the ICT industry, Korea's government ranks first in the world in terms of online services. The country's focus on developing its technological capacity as part of its economic development strategy has also improved its reputation for innovation.

Critical Thinking

1. Of the 10 countries profiled here, which seems
to move even higher up in the ranking over the
years? Why?
2. For countries not on the top-10 list, what are the
lessons they should take from the high-ranking

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Roberto Crotti is quantitative economist for t
petitiveness and Benchmarking Network at the W
Forum.

Article

Prepared by: Caroline Shaffer Westerhof,
California National University for Advanced Studies

The Lost Steve Jobs Tapes

A treasure trove of unearthed interviews, conducted by the writer who knew him best, reveals how Jobs's ultimate success at Apple can be traced directly to his so-called wilderness years.

BRENT SCHLENDER

Learning Outcomes

After reading this article, you will be able to:

- Describe the strengths and weaknesses of Steve Jobs's management style.
- Understand how Apple's iPod/iPhone/iPad technologies were informed more by the movie makers at Pixar than by computer makers at Apple and IBM.

If Steve Jobs's life were staged as an opera, it would be a tragedy in three acts. And the titles would go something like this: Act I—The Founding of Apple Computer and the Invention of the PC Industry; Act II—The Wilderness Years; and Act III—A Triumphant Return and Tragic Demise.

The first act would be a piquant comedy about the brashness of genius and the audacity of youth, abruptly turning ominous when our young hero is cast out of his own kingdom. The closing act would plumb the profound irony of a balding and domesticated high-tech rock star coming back to transform Apple far beyond even his own lofty expectations, only to fall mortally ill and then slowly, excruciatingly wither away, even as his original creation miraculously bulks up into the biggest digital dynamo of them all. Both acts are picaresque tales that end with a surge of deep pathos worthy of Shakespeare.

But that second act—The Wilderness Years—would be altogether different in tone and spirit. In fact, the soul of this act would undermine its title, a convenient phrase journalists and biographers use to describe his 1985 to 1996 hiatus from Apple, as if the only meaningful times in Jobs's life were those spent in Cupertino. In fact, this middle period was the most pivotal of his life. And perhaps the happiest. He finally settled down, married, and had a family. He learned the value of patience and the ability to feign it when he lost it. Most important, his work with the two companies he led during that time, NeXT and Pixar, turned him into the kind of man, and leader, who would spur Apple to unimaginable heights upon his return.

Indeed, what at first glance seems like more wandering for the barefoot hippie who dropped out of Reed College to hitchhike around India, is in truth the equivalent of Steve Jobs attending business school. In other words, he grew. By leaps and bounds. In every aspect of his being. With a little massaging, this middle act could even be the plotline for a Pixar movie. It certainly fits the simple mantra John Lasseter ascribes to all the studio's successes, from *Toy Story* to *Up*: "It's gotta be about how the main character changes for the better."

I had covered Jobs for *Fortune* and *The Wall Street Journal* since 1985, but I didn't come to fully appreciate the importance of these "lost" years until after his death last fall. Rummaging through the storage shed, I discovered some three dozen tapes holding recordings of extended interviews—some lasting as long as three hours—that I'd conducted with him periodically over the past 25 years. (Snippets are scattered throughout this story.) Many I had never replayed—a couple hadn't even been transcribed before now. Some were interrupted by his kids bolting into the kitchen as we talked. During others, he would hit the pause button himself before saying something he feared might come back to bite him. Listening to them again with the benefit of hindsight, the ones that took place during that interregnum jump out as especially enlightening.

The lessons are powerful: Jobs matured as a manager and a boss; learned how to make the most of partnerships; found a way to turn his native stubbornness into a productive perseverance. He became a corporate architect, coming to appreciate the scaffolding of a business just as much as the skeletons of real

buildings, which always fascinated him. He mastered the art of negotiation by immersing himself in Hollywood, and learned how to successfully manage creative talent, namely the artists at Pixar. Perhaps most important, he developed an astonishing adaptability that was critical to the hit-after-hit-after-hit climb of Apple's last decade. All this, during a time many remember as his most disappointing.

Eleven years is a big chunk of a lifetime. Especially when one's time on earth is cut short. Moreover, many people—particularly creative types—are often their most prolific during their thirties and early forties. With all the heady success of Apple during Jobs's last 14 years, it's all too easy to dismiss these "lost" years. But in truth, they transformed everything. As I listened again to those hours and hours of tapes, I realized they were, in fact, his most productive.

Steve Jobs did not wander aimlessly into the wilderness after being ousted from Apple in 1985. No happy camper, he was loaded for bear; burning to wreak revenge upon those who had spuriously shoved him into exile, and obsessed with proving to the world that he was no one-trick pony. Within days, he abruptly sold off all but one share of his Apple stock and, flush with a small fortune of about $70 million, set about creating another computer company, this one called NeXT. The startup ostensibly was a vehicle for revolutionizing higher education with powerful, beautiful computers. In reality, it was a bet that one day he would get the better of Apple.

Over all the years Jobs was away from Apple, I can't recall him saying one good thing about the company's brass. Early on, he whined about how CEO John Sculley had "poisoned" the culture of the place. As the years went by, and Apple's fortunes dimmed, Jobs's attacks became more pointed: "Right now it's like the wicked witch in The Wizard of Oz: 'I'm melting. I'm melting,' " he told me in the mid-1990s. "The jig is up. They can't seem to come out with a great computer to save their lives. They need to spend big on industrial design, reintroduce the hipness factor. But no, they hire [Gil] Amelio [as CEO]. It's as if Nike hired the guy that ran Kinney shoes."

At NeXT, Jobs was damn well going to deliver a great computer. He was going to do it with massive resources, raising well over $100 million from the likes of H. Ross Perot, Japanese printer maker Canon, and Carnegie Mellon University. He was going to do it with an astonishing automated factory in Fremont, California, where every surface and piece of equipment would be painted in specific shades of gray, black, and white. He was going to do it in style, working with a full-time architect to give the corporate headquarters in Redwood City a distinctive, austere aesthetic; NeXT HQ looked much like the interior of one of today's Apple Stores. The centerpiece was a staircase that seemed to float in air.

He was also going to do it with a revolutionary organization, something he dubbed the Open Corporation. "Think of it this way," he explained. "If you look at your own body, your cells are specialized, but every single one of them has the master plan for the whole body. We think our company will be the best possible company if every single person working here understands the whole master plan and can use that as a yardstick to make decisions against. We think a lot of little and medium and big decisions will be made better if all our people know that." It was a bold theory.

If Jobs's time in exile can be seen as an extended trip through business school, the heady start of NeXT represents those early days when a student thinks he knows everything and is in a rush to show that to the world. In fact, Jobs had just about every detail wrong. The Open Corporation was a dismal failure in practice. Its hallmark was that employee salaries were not kept secret; there was even an attempt to impose uniform compensation. It didn't work, of course; all kinds of side deals were cut to satiate key employees.

More concretely, Jobs had the whole business plan wrong. It would be two years before NeXT delivered anything to customers. When the NeXTcube computer finally did arrive, it proved too expensive to ever command a serious market. Ultimately, Jobs was forced to admit that the undeniably beautiful machine he and his engineering team concocted was a flop. He laid off most of the staff and turned the company from hardware to software, first to rewrite NeXT's operating system, called NextSTEP, for Intel-based computers. The company also engineered an ingenious development environment called WebObjects, which eventually became its best-selling program.

Jobs didn't know that WebObjects would later prove instrumental in building the online store for Apple and for iTunes, or that NextSTEP would be his ticket back to Apple. The road for NeXT was always rocky, perhaps appropriate for something that was born out of a desire for revenge. It was a good thing he had something else going on the side.

Of the three companies Jobs helped create, Pixar was the purest corporate and organizational expression of his nature. If NeXT was a travail of spite and malice, Pixar was a labor of love.

The Pixar story began even before Jobs left Apple. In early 1985, Apple fellow Alan Kay called his attention to the computer Graphics Group (GG) skunk works in San Rafael, California, an ill-fitting piece of the filmmaking production puzzle George Lucas had assembled for his Skywalker Ranch studios. It was little more than a team of 25 engineers—including a young "user interface designer" named John Lasseter—who desperately wanted to continue to work together even though Lucas, then embroiled in the costly aftermath of a divorce, was looking to sell.

Jobs's trip to take a look-see left an indelible impression. GG's head geek, Ed Catmull, showed him some short demo films made by Lasseter, who was neither a programmer nor a

rface designer, but a talented animator who had left nd been given his faux title by Catmull as a way to Lucas to put him on the payroll. The films weren't look at, but they were three-dimensional, they were by computer rather than hand-drawn, and they dis- e whimsy of a master storyteller.

ated, Jobs tried, unsuccessfully, to persuade Apple's buy the group. "These guys were way ahead of us cs, way ahead," Jobs remembered. "They were way anybody. I just knew in my bones that this was going important." After getting bounced from Apple, Jobs to Lucas and drove a hard bargain. He paid $5 mil- e group's assets and provided another $5 million in apital for the company, which was christened Pixar. ght, the price was a pittance. But in 1985, nobody e expected Pixar to one day outstrip NeXT. Certainly He didn't build any fancy digs for his motley crew ors and engineers, who for years made do with used nd dowdy offices.

gain, what Jobs knew in his bones didn't translate g the details right. As with NeXT, Jobs initially he company to be a purveyor of high-performance hardware, this time for two frightfully niche mar- pecial-effects departments of Hollywood studios and naging specialists. By 1989, however, Pixar had sold hundred of its Pixar Image Computers, faux-granite bes originally stickered at $135,000, that had to be h expensive engineering workstations to do anything. ne, the strategy pivot came from the talent. In 1990, nd Catmull told Jobs they could make a business of omputer-animated TV commercials—perhaps one ould even make, and sell, cartoons! Jobs was smit- atmull and Lasseter. They were always teaching him new. Could they deliver on the ultimate promise of to use computers to create an entirely new kind of for the cinema and thus upend the entire business nimation? Jobs decided to focus on this one disrup- unity. It was an instinct he would return to, repeat- he rejoined Apple.

he fired much of the Pixar staff, announced the new o the survivors, and reorganized so that the studio ue one animated project at a time. "I got everybody Jobs said, "and I said, 'At our heart, we really are a mpany. Let's transition out of everything else. Let's his is why I bought into Pixar. This is why most of re. Let's go for it. It's a higher-risk strategy, but the e gonna be much higher, and it's where our hearts he and CFO Lawrence Levy went to work learn- ing they could about the dynamics and economics nation business. If they were going to start making ey were going to do it right.

The shift at Pixar occurred at about the same time as the major turn in Jobs's personal life: the blossoming of his romance with Laurene Powell. In 1991, two years after she met him following an informal lecture at Stanford University's Graduate School of Business, Laurene was his pregnant bride, married by a Buddhist monk at the Ahwahnee Hotel in Yosemite National Park.

Jobs had never seemed like the marrying type and hadn't shown much of a sense of responsibility for Lisa, his first daughter, who was born out of wedlock in 1978. He denied paternity initially, even though he had named an Apple computer after her. Egotistical, narcissistic, and manipulative since childhood, Jobs often behaved like a spoiled brat who was accustomed to getting his way.

His personality didn't change overnight after meeting Laurene, but his selfish ways did begin to moderate, especially after his children, Reed, Erin, and Eve, came into the family in 1991, 1995, and 1998, respectively. As is often the case with new parents, Jobs behaved as if he were the first person in the world to discover and fully appreciate the joys of family life. He literally stayed closer to home, converting a clapboard storefront building catty-corner from the Palo Alto Whole Foods into a satellite office so his commute would be a short bike ride. (He didn't use the office all that much after returning to Apple.)

My bureau was a block up the street, and occasionally I'd see him out for a stroll, usually with someone in tow. He always said he could think better when he walked. During these years, his fame had subsided somewhat, so it wasn't like encountering one of the Beatles at the supermarket. People pretty much left him alone.

I bumped into him on one of those walks when he was alone, and wound up joining him as he shopped for a new bicycle for Laurene's upcoming birthday. This was before you could do your homework on the Internet, but he had done his research, so there wasn't much shopping involved. We were in and out of Palo Alto Bicycles in 10 minutes. "I'd never have Andrea do something like this," he said, referring to his longtime administrative assistant. "I like buying presents for my family myself."

Even after he went back to Apple, there was nothing Jobs liked more than spending time at home. Not that he wasn't a workaholic. We were iChat buddies for several years, so his name would pop up whenever he was working at his computer at home. Almost invariably, he was in front of his Mac until after midnight. We'd occasionally have a video chat, and if it took place early in the evening, I'd often see one of his children in the background looking on.

In hindsight, Jobs's having a real family might have been the best thing to happen to Pixar. He was most effective as a marketer and a business leader when he could think of himself as the primary customer. What would he want from a computer-animated movie, both for himself and for his kids? That was the

only market-research question he ever asked. He had always demanded great production values and design for his computer products. He was just as picky about what Pixar produced. Lasseter and Catmull couldn't have asked for a more empathetic benefactor.

Shortly after his decision in 1990 to let Lasseter and Catmull start producing commercials and short films, Jobs pulled a rabbit out of his hat: He negotiated a $26 million marketing distribution deal with Disney that provided enough capital to make a full-length, computer-animated motion picture. Because Disney had been a Pixar customer, licensing its software for managing conventional animators, then-CEO Michael Eisner and his head of animation, Jeffrey Katzenberg, were fully aware that the company's technology was solid and unique, and that Lasseter showed flashes of genius as a new breed of animator.

Jobs was candid about the two Disney execs, telling me that both "make the mistake of not appreciating technology. They just assume that they can throw money at things and fix them. They don't have a clue." Once upon a time, he would have been enraged by the ignorance he perceived. When I asked him what had soured an earlier partnership between IBM and NeXT, he ranted: "The people at the top of IBM knew nothing about computers. Nothing. Nothing. The people at the top of Disney," on the other hand, "know a lot about what a really good film is and what is not."

Even though he believed that Katzenberg and Eisner "had no clue" about how far Pixar could take them—Jobs was convinced that Pixar's technology could revolutionize the business model for animation, which was then primarily a hand-drawn art—he recognized that the partnership had more or less saved the company: "It's the biggest thing I've done for Pixar," he said. So he found a common bond between the companies. "There was a certain amount of fear and trepidation, but what always happened was that making a great movie was the focal point of everybody's concerns. One way to drive fear out of a relationship is to realize that your partner's values are the same as yours, that what you care about is exactly what they care about. In my opinion, that drives fear out and makes for a great partnership, whether it's a corporate partnership or a marriage."

Then he set about designing an organization that could deliver a great movie—and many more. His foray into Hollywood had taught him a great deal. "I started to learn about how films are made. Basically, it's bands of gypsies getting together to make a film. After the film, they disband. The problem with that is we want to build a company, not just make a single movie."

This time, there was no flighty discussion of an "open" corporation. "Incentive structures work," he told me. "So you have to be very careful of what you incent people to do, because various incentive structures create all sorts of consequences that you can't anticipate. Everybody at Pixar is incented to build the company: whether they're working on the fil whether they're working on a potential direct-to-video pro uct; whether they're working on a CD-ROM. Whatever th combination of creative and technical talent may be, we wa them incented to make the whole company successful."

There was another compensation detail that reflected h completely Jobs was able to mesh the values of Silicon V ley with Hollywood. Pixar paid its animators just as well as software geniuses (beginning an escalation in salaries that K zenberg accelerated later that decade at DreamWorks). "V value them both equally," Jobs said of Pixar's two talent cam "Some people say we should value one higher than the oth but we value them equally, we pay them equally, they have sto equally. We made that decision very early. Ed Catmull made th decision, actually. We will always do that; that's one of Pixa core values."

These were the decisions that cemented the compan future success. When Disney surprised Jobs by scheduli Pixar's first movie as its 1995 holiday feature, his team w ready, with a little picture called *Toy Story*. And Jobs, arm with a renegotiated Disney deal for three pictures, was rea too; Pixar went public 10 days after *Toy Story's* stunning deb raising nearly $100 million.

After that, it was as if the company hit the fast-forwa button. And for the rest of his life, Jobs enjoyed Pixar as enjoyed little else. Now was the time to throw away the us furniture and build a proper studio in Emeryville, Californ He relished this so much more than the NeXT headquarters after all, this time he and his team had earned it. The desi blended aspects of a Hollywood lot and an old-fashioned bri factory building, perfect for his star animators and progra mers, perfect for working with Tom Hanks, Ellen DeGener Owen Wilson, and all the other stars who enjoyed voicing Pix characters. The custom-made bricks came in 12 shades, a if the colors weren't distributed evenly enough, Jobs wou have the bricklayers pull them down and do it again. He wou visit the construction site as often as he could as it ca together, often clambering around the buildings at night, wh no one but the security guards were around.

He also created something called Pixar University for t staff, where his brilliant engineers and clever artists and sm financial people could take classes in all kinds of subjects, better appreciate what their coworkers did. There were class in the visual arts, dance, computer programming, forei languages, drama, mathematics, creative writing, and ev accounting. "It is," he once told me, "the coolest place to wo in the world."

When Jobs returned to Apple in 1997, one of the first thin he did was trim the product line, focusing employees on fo clear projects. He liked to explain his strategy while drawi on a whiteboard, like a professor of management. For all t

Pixar brought Jobs, it was NeXT that got him back to
After failing to develop new software architecture for
and bungling a joint venture with IBM, Apple was on
bled in 1996. NeXT had a powerful, modern operat-
m and one very persuasive storyteller, who managed to
CEO Amelio that his stepchild could be Apple's sal-
late 1996, Jobs sold NeXT to Apple for $400 million,
used to pay back Perot, Canon, and some other early
Within six months, Jobs had mounted a putsch and
Apple's "iCEO," with the i standing for what proved to
ly false "interim."

suing tale, the saga of the modern Apple, is simply
of the man who emerged from that 11-year business
d implemented the lessons he had learned along the
as true when he started at Pixar and NeXT. Jobs had
he details wrong when he first returned to the Apple
imagined that the company's business would always
computers. He thought that what was then called the
on highway" would be primarily of interest to busi-
e dismissed the idea that computer networks would
of video.

me of the tougher years at NeXT and Pixar had taught
o stretch a company's finances, which helped him
s first couple of years back, when Apple was still reli-
eak jumble of offerings. With newfound discipline,
streamlined the company's product lines. And just
Pixar, he aligned the company behind those proj-
ay that had never been done before at a technology
but that looked a lot like an animation studio bent
g one great movie a year—Jobs created the organi-
ength to deliver one hit after another, each an exten-
ple's position as the consumer's digital hub, each
s its predecessor. If there's anything that parallels
ade-long string of hits—iMac, PowerBook, iPod,
ne, iPad, to list just the blockbusters—it's Pixar's
ers, including *Toy Story, Monsters, Inc., Finding*
ncredibles, WALL-E, and *Up*. These insanely great
ld have come only from insanely great companies,
hat Jobs had learned to build.

learned how to treat talent at Pixar; he spoke to
s colleagues there differently from the way he dis-
NeXT coworkers. When he returned to Apple, he
ed his very top management team in the same
with the occasional notable exception. As he had
rs and programmers at Pixar, he integrated design-
nologists at Apple. He cultivated a team he could
luding the great designer Jonathan Ive, who is to
Lasseter is to Pixar. "We've done so many hard-
s where Jony and I have looked at each other and
n't know how to make it any better than this, we
w how to make it,' " Jobs told me. "But we always
do; we realize another way. And then it's not long after the new thing comes out that we look at the older thing and go, 'How can we ever have done that?' "

When I listened to this quote again last month, I was struck by something else in it: the combination of adaptability and intuition that proved so critical to Apple's rise. Jobs may have been impulsive at times, but he was always methodical. This kind of nature suited an autodidact with eclectic tastes, empowering him either to obsess impatiently about a pressing problem that had to be dealt with immediately—much like an engineer—or else to let an idea steep and incubate until he got it right. This is why Jobs was so often right on the big picture, even when he got the details wrong. Open salaries was a dumb detail of the Open Corporation, but its core idea, of a workplace where every single person understands the company's goals, is something that most organizations get wrong and that Apple has gotten so right for well over a decade. If Jobs was initially wrong about Apple getting into phones and handheld devices, he was right on about the big idea of the computer at the center of a whirling digital universe. Hence Apple's ability to deliver a great iTunes store after the iPod, even though it was never planned. Hence the great iPhone, despite Jobs's dismissal of "Swiss Army knife" digital devices.

There was one other big lesson he learned from his Hollywood adventure: People remember stories more than products. "The technology we've been laboring on over the past 20 years becomes part of the sedimentary layer," he told me once. "But when *Snow White* was re-released [on DVD, in 2001], we were one of the 28 million families that went out and bought a copy of it. This was a film that is 60 years old, and my son was watching it and loving it. I don't think anybody's going to be beating on a Macintosh 60 years from now."

Once he realized he really was going to die, Jobs quietly began to think more seriously about the story of his own life and creations. At his memorial service, Laurene remarked that what struck her most upon really getting to know him was his "fully formed aesthetic sense." He knew exactly what he liked, and he analyzed it until he could tell you precisely why. Jobs always felt that architecture could be a truly lasting expression of one's aesthetic, reaching beyond the limits of one's lifetime. It wasn't incidental, then, that his last public appearance was at a Cupertino City Council meeting to unveil the breathtaking four-story, doughnut-shaped "mother ship" that's nearly a half-mile in diameter and that will one day become Apple's headquarters.

Of course, Jobs wanted his own official story to measure up. So he enlisted Walter Isaacson—creator of a virtual Mount Rushmore of best-selling biographies of Benjamin Franklin, Albert Einstein, and Henry Kissinger—to tell his tale. Like those giants, Jobs is a man whose history will be told many a time, with fresh insights and new reporting. In the retelling, it

Article

Prepared by: Caroline Shaffer Westerhof,
California National University for Advanced Studies

How Technology Is Destroying Jobs

DAVID ROTMAN

Learning Outcomes

After reading this article, you will be able to:

- Articulate the arguments both for why technology innovation causes unemployment and why it does not.
- Understand what workplace robots are and how the growth in their use may affect employment today.

Given his calm and reasoned academic demeanor, it is easy to miss just how provocative Erik Brynjolfsson's contention really is. Brynjolfsson, a professor at the MIT Sloan School of Management, and his collaborator and coauthor Andrew McAfee have been arguing for the last year and a half that impressive advances in computer technology—from improved industrial robotics to automated translation services—are largely behind the sluggish employment growth of the last 10 to 15 years. Even more ominous for workers, the MIT academics foresee dismal prospects for many types of jobs as these powerful new technologies are increasingly adopted not only in manufacturing, clerical, and retail work but in professions such as law, financial services, education, and medicine.

That robots, automation, and software can replace people might seem obvious to anyone who's worked in automotive manufacturing or as a travel agent. But Brynjolfsson and McAfee's claim is more troubling and controversial. They believe that rapid technological change has been destroying jobs faster than it is creating them, contributing to the stagnation of median income and the growth of inequality in the United States. And, they suspect, something similar is happening in other technologically advanced countries.

Perhaps the most damning piece of evidence, according to Brynjolfsson, is a chart that only an economist could love. In economics, productivity—the amount of economic value created for a given unit of input, such as an hour of labor—is a crucial indicator of growth and wealth creation. It is a measure of progress. On the chart Brynjolfsson likes to show, separate lines represent productivity and total employment in the United States. For years after World War II, the two lines closely tracked each other, with increases in jobs corresponding to increases in productivity. The pattern is clear: as businesses generated more value from their workers, the country as a whole became richer, which fueled more economic activity and created even more jobs. Then, beginning in 2000, the lines diverge; productivity continues to rise robustly, but employment suddenly wilts. By 2011, a significant gap appears between the two lines, showing economic growth with no parallel increase in job creation. Brynjolfsson and McAfee call it the "great decoupling." And Brynjolfsson says he is confident that technology is behind both the healthy growth in productivity and the weak growth in jobs.

It's a startling assertion because it threatens the faith that many economists place in technological progress. Brynjolfsson and McAfee still believe that technology boosts productivity and makes societies wealthier, but they think that it can also have a dark side: technological progress is eliminating the need for many types of jobs and leaving the typical worker worse off than before. Brynjolfsson can point to a second chart indicating that median income is failing to rise even as the gross domestic product soars. "It's the great paradox of our era," he says. "Productivity is at record levels, innovation has never been faster, and yet at the same time, we have a falling median income and we have fewer jobs. People are falling behind because technology is advancing so fast and our skills and organizations aren't keeping up."

Brynjolfsson and McAfee are not Luddites. Indeed, they are sometimes accused of being too optimistic about the extent and speed of recent digital advances. Brynjolfsson says they began writing *Race Against the Machine*, the 2011 book in which they laid out much of their argument, because they wanted to explain the economic benefits of these new technologies (Brynjolfsson spent much of the 1990s sniffing out evidence that information technology was boosting rates of productivity). But it

became clear to them that the same technologies making many jobs safer, easier, and more productive were also reducing the demand for many types of human workers.

Anecdotal evidence that digital technologies threaten jobs is, of course, everywhere. Robots and advanced automation have been common in many types of manufacturing for decades. In the United States and China, the world's manufacturing powerhouses, fewer people work in manufacturing today than in 1997, thanks at least in part to automation. Modern automotive plants, many of which were transformed by industrial robotics in the 1980s, routinely use machines that autonomously weld and paint body parts—tasks that were once handled by humans. Most recently, industrial robots like Rethink Robotics' Baxter more flexible and far cheaper than their predecessors, have been introduced to perform simple jobs for small manufacturers in a variety of sectors. The website of a Silicon Valley startup called Industrial Perception features a video of the robot it has designed for use in warehouses picking up and throwing boxes like a bored elephant. And such sensations as Google's driverless car suggest what automation might be able to accomplish someday soon.

A less dramatic change, but one with a potentially far larger impact on employment, is taking place in clerical work and professional services. Technologies like the Web, artificial intelligence, big data, and improved analytics—all made possible by the ever increasing availability of cheap computing power and storage capacity—are automating many routine tasks. Countless traditional white-collar jobs, such as many in the post office and in customer service, have disappeared. W. Brian Arthur, a visiting researcher at the Xerox Palo Alto Research Center's intelligence systems lab and a former economics professor at Stanford University, calls it the "autonomous economy." It's far more subtle than the idea of robots and automation doing human jobs, he says: it involves "digital processes talking to other digital processes and creating new processes," enabling us to do many things with fewer people and making yet other human jobs obsolete.

It is this onslaught of digital processes, says Arthur, that primarily explains how productivity has grown without a significant increase in human labor. And, he says, "digital versions of human intelligence" are increasingly replacing even those jobs once thought to require people. "It will change every profession in ways we have barely seen yet," he warns.

McAfee, associate director of the MIT Center for Digital Business at the Sloan School of Management, speaks rapidly and with a certain awe as he describes advances such as Google's driverless car. Still, despite his obvious enthusiasm for the technologies, he doesn't see the recently vanished jobs coming back. The pressure on employment and the resulting inequality will only get worse, he suggests, as digital technologies—fueled with "enough computing power, data, and geeks"—continue their exponential advances over the coming decades. "I would like to be wrong," he says, "but when these science-fiction technologies are deployed, what will we need all the people for?"

New Economy?

But are these new technologies really responsible for the current spell of lackluster job growth? Many labor economists say so. Yet they are, at best, far from conclusive. Several other plausible explanations, including events related to global trade and the financial crises of the early and late 2000s, could account for the relative slowness of job creation since the turn of the century. "No one really knows," says Richard Freeman, a labor economist at Harvard University. That's because it's very difficult to "extricate" the effects of technology from other forces with economic effects, he says. But he's skeptical that technology would change a wide range of business sectors fast enough to explain recent job numbers.

Employment trends have polarized the workforce and hollowed out the middle class.

David Autor, an economist at MIT who has extensively studied the connections between jobs and technology, doubts that technology could account for such an abrupt change in employment. "There was a great sag in employment in 2000. Something did change," he says. "But technology is not the cause." Moreover, he doubts that productivity has actually risen robustly in the United States in the past decade. Economists can disagree about that statistic because there are different ways of measuring and weighing economic outputs). If he's right, it raises the possibility that productivity growth could be simply a result of a sluggish economy. The sudden slowdown in job creation "is a big puzzle," he says, but there's not a lot of evidence it's linked to computers.

To be sure, Autor says, computer technologies are changing the types of jobs available, and those changes "are profound and for the good." At least since the 1980s, he says, computers have increasingly taken over such tasks as bookkeeping, clerical work, and repetitive production jobs in manufacturing—jobs which typically provided middle-class pay. At the same time, higher-paying jobs requiring creativity and problem-solving skills, often aided by computers, have proliferated, as have low-skill jobs: demand has increased for restaurant workers, janitors, home health aides, and others doing service work that is nearly impossible to automate. The result, says

en a "polarization" of the workforce and a "hollowing out" the middle class—something that has been happening in merous industrialized countries for the last several decades. t "that is very different from saying technology is affecting e total number of jobs," he adds. "Jobs can change a lot with-t there being huge changes in employment rates."

What's more, even if today's digital technologies are hold-g down job creation, history suggests that it is most likely a mporary, albeit painful, shock; as workers adjust their skills d entrepreneurs create opportunities based on the new tech-logies, the number of jobs will rebound. That, at least, has ways been the pattern. The question, then, is whether today's mputing technologies will be different, creating long-term oluntary unemployment.

At least since the Industrial Revolution began in the 1700s, provements in technology have changed the nature of work and troyed some types of jobs in the process. In 1900, 41 percent Americans worked in agriculture; by 2000, it was only 2 per-t. Likewise, the proportion of Americans employed in man-cturing has dropped from 30 percent in the post-World War ears to around 10 percent today—partly because of increas-automation, especially during the 1980s.

While such changes can be painful for workers whose skills longer match the needs of employers, Lawrence Katz, a Har-d economist, says that no historical pattern shows these shifts ding to a net decrease in jobs over an extended period. Katz done extensive research on how technological advances e affected jobs over the last few centuries—describing, for mple, how highly skilled artisans in the mid-19th century e displaced by lower-skilled workers in factories. While it take decades for workers to acquire the expertise needed new types of employment, he says, "we never have run out obs. There is no long-term trend of eliminating work for ple. Over the long term, employment rates are fairly stable. ple have always been able to create new jobs. People come vith new things to do."

Still, Katz doesn't dismiss the notion that there is something erent about today's digital technologies—something that d affect an even broader range of work. The question, he , is whether economic history will serve as a useful guide. the job disruptions caused by technology be temporary as workforce adapts, or will we see a science-fiction scenario in ch automated processes and robots with superhuman skills over a broad swath of human tasks? Though Katz expects istorical pattern to hold, it is "genuinely a question," he says. echnology disrupts enough, who knows what will happen?"

. Watson

et some insight into Katz's question, it is worth looking at today's most advanced technologies are being deployed in industry. Though these technologies have undoubtedly taken over some human jobs, finding evidence of workers being displaced by machines on a large scale is not all that easy. One reason it is difficult to pinpoint the net impact on jobs is that automation is often used to make human workers more efficient, not necessarily to replace them. Rising productivity means businesses can do the same work with fewer employees, but it can also enable the businesses to expand production with their existing workers, and even to enter new markets.

Take the bright-orange Kiva robot, a boon to fledgling e-commerce companies. Created and sold by Kiva Systems, a startup that was founded in 2002 and bought by Amazon for $775 million in 2012, the robots are designed to scurry across large warehouses, fetching racks of ordered goods and delivering the products to humans who package the orders. In Kiva's large demonstration warehouse and assembly facility at its headquarters outside Boston, fleets of robots move about with seemingly endless energy: some newly assembled machines perform tests to prove they're ready to be shipped to customers around the world, while others wait to demonstrate to a visitor how they can almost instantly respond to an electronic order and bring the desired product to a worker's station.

A warehouse equipped with Kiva robots can handle up to four times as many orders as a similar unautomated warehouse, where workers might spend as much as 70 percent of their time walking about to retrieve goods. (Coincidentally or not, Amazon bought Kiva soon after a press report revealed that workers at one of the retailer's giant warehouses often walked more than 10 miles a day.)

Despite the labor-saving potential of the robots, Mick Mountz, Kiva's founder and CEO, says he doubts the machines have put many people out of work or will do so in the future. For one thing, he says, most of Kiva's customers are e-commerce retailers, some of them growing so rapidly they can't hire people fast enough. By making distribution operations cheaper and more efficient, the robotic technology has helped many of these retailers survive and even expand. Before founding Kiva, Mountz worked at Webvan, an online grocery delivery company that was one of the 1990s dot-com era's most infamous flameouts. He likes to show the numbers demonstrating that Webvan was doomed from the start; a $100 order cost the company $120 to ship. Mountz's point is clear: something as mundane as the cost of materials handling can consign a new business to an early death. Automation can solve that problem.

Meanwhile, Kiva itself is hiring. Orange balloons—the same color as the robots—hover over multiple cubicles in its sprawling office, signaling that the occupants arrived within the last month. Most of these new employees are software engineers: while the robots are the company's poster boys, its lesser-known innovations lie in the complex algorithms that guide the robots' movements and determine where in the warehouse

products are stored. These algorithms help make the system adaptable. It can learn, for example, that a certain product is seldom ordered, so it should be stored in a remote area.

Though advances like these suggest how some aspects of work could be subject to automation, they also illustrate that humans still excel at certain tasks—for example, packaging various items together. Many of the traditional problems in robotics—such as how to teach a machine to recognize an object as, say, a chair—remain largely intractable and are especially difficult to solve when the robots are free to move about a relatively unstructured environment like a factory or office.

Techniques using vast amounts of computational power have gone a long way toward helping robots understand their surroundings, but John Leonard, a professor of engineering at MIT and a member of its Computer Science and Artificial Intelligence Laboratory (CSAIL), says many familiar difficulties remain. "Part of me sees accelerating progress; the other part of me sees the same old problems," he says. "I see how hard it is to do anything with robots. The big challenge is uncertainty." In other words, people are still far better at dealing with changes in their environment and reacting to unexpected events.

For that reason, Leonard says, it is easier to see how robots could work *with* humans than on their own in many applications. "People and robots working together can happen much more quickly than robots simply replacing humans," he says. "That's not going to happen in my lifetime at a massive scale. The semiautonomous taxi will still have a driver."

One of the friendlier, more flexible robots meant to work with humans is Rethinks Baxter. The creation of Rodney Brooks, the company's founder, Baxter needs minimal training to perform simple tasks like picking up objects and moving them to a box. It's meant for use in relatively small manufacturing facilities where conventional industrial robots would cost too much and pose too much danger to workers. The idea, says Brooks, is to have the robots take care of dull, repetitive jobs that no one wants to do.

It's hard not to instantly like Baxter, in part because it seems so eager to please. The "eyebrows" on its display rise quizzically when it's puzzled; its arms submissively and gently retreat when bumped. Asked about the claim that such advanced industrial robots could eliminate jobs, Brooks answers simply that he doesn't see it that way. Robots, he says, can be to factory workers as electric drills are to construction workers: "It makes them more productive and efficient, but it doesn't take jobs."

The machines created at Kiva and Rethink have been cleverly designed and built to work with people, taking over the tasks that the humans often don't want to do or aren't especially good at. They are specifically designed to enhance these workers' productivity. And it's hard to see how even these increasingly sophisticated robots will replace humans in most manufacturing and industrial jobs anytime soon. But clerical and some professional jobs could be more vulnerable. That's because the marriage of artificial intelligence and big data is beginning to give machines a more humanlike ability to reason and to solve many new types of problems.

Even if the economy is only going through a transition, it is an extremely painful one for many.

In the tony northern suburbs of New York City, IBM Researc is pushing super-smart computing into the realms of such pr fessions as medicine, finance, and customer service. IBM efforts have resulted in Watson, a computer system best know for beating human champions on the game show *Jeopard* in 2011. That version of Watson now sits in a corner of a lar data center at the research facility in Yorktown Heights, mark with a glowing plaque commemorating its glory days. Mea while, researchers there are already testing new generations Watson in medicine, where the technology could help phy cians diagnose diseases like cancer, evaluate patients, a prescribe treatments.

IBM likes to call it cognitive computing. Essentially, W son uses artificial-intelligence techniques, advanced natu language processing and analytics, and massive amounts data drawn from sources specific to a given application (in case of health care, that means medical journals, textbooks, information collected from the physicians or hospitals us the system). Thanks to these innovative techniques and h amounts of computing power, it can quickly come up "advice"—for example, the most recent and relevant infor tion to guide a doctor's diagnosis and treatment decisions.

Despite the system's remarkable ability to make sens all that data, it's still early days for Dr. Watson. While it rudimentary abilities to "learn" from specific patterns evaluate different possibilities, it is far from having the of judgment and intuition a physician often needs. But has also announced it will begin selling Watson's servic customer-support call centers, which rarely require hu judgment that's quite so sophisticated. IBM says comp will rent an updated version of Watson for use as a "cust service agent" that responds to questions from consume has already signed on several banks. Automation is no new in call centers, of course, but Watson's improved c ity for natural-language processing and its ability to tap a large amount of data suggest that this system could plainly with callers, offering them specific advice on even nical and complex questions. It's easy to see it replacing human holdouts in its new field.

l Losers

ntion that automation and digital technologies responsible for today's lack of jobs has obvi- hed a raw nerve for many worried about their yment. But this is only one consequence of what on and McAfee see as a broader trend. The rapid n of technological progress, they say, has greatly e gap between economic winners and losers—the qualities that many economists have worried about s. Digital technologies tend to favor "superstars," out. For example, someone who creates a computer automate tax preparation might earn millions or dollars while eliminating the need for countless s.

hnologies are "encroaching into human skills in is completely unprecedented," McAfee says, and le-class jobs are right in the bull's-eye; even rela- -skill work in education, medicine, and law is he middle seems to be going away," he adds. "The ttom are clearly getting farther apart." While tech- ht be only one factor, says McAfee, it has been an eciated" one, and it is likely to become increasingly

ryone agrees with Brynjolfsson and McAfee's —particularly the contention that the impact of nological change could be different from anything . But it's hard to ignore their warning that tech- widening the income gap between the tech-sawy ne else. And even if the economy is only going ransition similar to those it's endured before, it is y painful one for many workers, and that will have ssed somehow. Harvard's Katz has shown that the es prospered in the early 1900s in part because sec- cation became accessible to many people at a time oyment in agriculture was drying up. The result, at h the 1980s, was an increase in educated workers jobs in the industrial sectors, boosting incomes and equality. Katz's lesson: painful long-term conse- the labor force do not follow inevitably from tech- hanges.

Brynjolfsson himself says he's not ready to conclude that economic progress and employment have diverged for good. "I don't know whether we can recover, but I hope we can," he says. But that, he suggests, will depend on recognizing the problem and taking steps such as investing more in the training and education of workers.

"We were lucky and steadily rising productivity raised all boats for much of the 20th century," he says. "Many people, especially economists, jumped to the conclusion that was just the way the world worked. I used to say that if we took care of productivity, everything else would take care of itself; it was the single most important economic statistic. But that's no longer true." He adds, "It's one of the dirty secrets of economics: technology progress does grow the economy and create wealth, but there is no economic law that says everyone will benefit." In other words, in the race against the machine, some are likely to win while many others lose.

Critical Thinking

1. Define productivity and explain why when technology innovation makes one employee more productive it does not automatically cost other employees their jobs.
2. Brynjolfsson demonstrates that something new happened around 2001 so that increased productivity no longer led to a growth in the number of jobs. Generate at least three independent hypotheses as to why there appeared a sudden change in this relationshp at that point in time.

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Article

Prepared by: Caroline Shaffer Westerho
California National University for Advanced Studie

The Tricky Business of Innovation: Can You Patent a Magic Trick?

RICK LAX

Learning Outcomes

After reading this article, you will be able to:

- Understand that Intellectual Property law consists of several independent concepts.
- Define the IP concepts of: Patent, Copyright, Trade Secret, and Trade Dress.

I created a magic trick with a balloon. You stretch out the balloon's nozzle, rip it off, and then magically reattach it as the balloon deflates. No secret props, no extra pieces: just one balloon. I spent months developing this trick, perfecting the psychology and the physiology. Then I spent weeks filming and editing the trick with magic distributor Theory11.com. We released "Detach" in February of 2012.

Some company in Russia copied it a couple months later. But they didn't just copy my trick—move for move, beat for beat—they copied the look and feel of the marketing in the trailer, too. [You can see for yourself by comparing those two links.]

In the field of magic, theft is *rampant.* Close-up magic wholesalers steal from close-up magic wholesalers. Parlor manipulators steal from parlor manipulators. Large-scale illusionists steal from large-scale illusionists.

Why do they do it? Because they can.

David Copperfield spends years developing illusions, perfecting patter, and mastering misdirection. And then lots of large-scale illusionists steal his style, his jokes, his presentations. "French law protects artists much better than U.S. law," Copperfield says. "In France, I sued someone who stole my Flying illusion, and I was successful. The lawsuit prevented him from performing it again without compensating me."

Here in America, intellectual property law offers less he to magicians.

Everyone Steals—And It's Not about Innovation

Since moving to Vegas six years ago, I've gotten to know handful of notable magicians and every single one of the has been ripped off. Bizzaro makes and sells Color Changi Sponge Balls; two different manufacturers market it witho his permission internationally. Losander created a big, beau ful $2,000 illusion floating table; you can now buy a crapp knockoff for $500. Jeff McBride spent years developing manipulation act that incorporates masks with feathers, cane umbrellas, and streamers; someone in Thailand copied th entire thing. And that company in Russia continued to copy m other tricks: a card trick, a headphones trick.

Unfortunately, none of this copying is about the kind o competition and innovation that one arguably sees in an indus try like fashion.

Just last month, Criss Angel attempted an illusion very sim lar to one done by German illusionist Jan Rouven in 2009. goes like this: Six swords are hung above a table, upon whic the magician lies. Five swords are positioned to fall inche away from the magician's body; one is positioned over th heart. The swords' handles are connected to ropes and given a spectator, who releases them, one by one, not knowing whic rope is connected to the kill sword. After the magician survive the five drops, he gets off the table to demonstrate what woul have happened if the spectator had released the kill sword. plunges down to where the magician's heart just was.

Rouven tells me that his backstage manager caug Angel examining the prop after one of Rouven's shows, an

Angel never asked Rouven for permission to per-
rick. What Angel did do—here's where things get
—is get "permission" from fantasy/horror director
er, whose 1995 film *Lord of Illusions* contained a
hich a magician performed a trick in which swords
nto a table upon which the magician lay. Angel's
l a lot like the one in Barker's movie (circular table,
extra sword), not like Rouven's.
similarities between Angel's trick and the *Lord of*
ck ended there. The *Lord of Illusions* trick was an
onstration in which the magician was locked to the
very sword was positioned to fall on him. In the
swords weren't released by ropes held by a specta-
opped automatically), and the table rotated in one
ile the hanging swords rotated in the other. None of
applied to Angel's trick.
made a prop that *looked* like Barker's but *func-*
Rouven's.
y? The trick malfunctioned (the kill sword didn't
op was repaired in full view of the live audience),
website later rewrote who owned the trick by stat-
s the only magician to whom Clive has given his
nd blessing to recreate this illusion, and no one
e performing it without Mr. Barker's permission."

cks of the Law

he rampant copying or stealing has led to any new
r advanced the field of magic.
ian invents a device that allows him to, say, tele-
e stage in the blink of an eye, he can patent the
e patents themselves are open to the public. Any-
nem. When an R. J. Reynolds tobacco newspaper
lorace Goldin's "Sawing a Lady in Half" illusion
ed for "unfair competition," the court sided with
entially arguing something like "if you wanted to
t you shouldn't have patented it."
n't protect secrets; they reveal them. Plus, many
cks don't use special devices; they use misdirec-
nt-of-hand.
t trade secret law? (This is different than trade-
ch only lets you protect the name or logo of your
y is found against only those who share secrets
That means you can't score a job as Copperfield's
ise to keep his secrets, and then turn around and
g his tricks yourself. However, if you figure out
sions while sitting in the audience, trade secret
you from copying it and performing it.
ic creator Andre Kole sued the "Masked Magi-
for exposing his "Table of Death" illusion. It
The court said the trick was too similar to a trick
that had been published in several magic books in the 1800s, and that under trade secret law, the courts must consider the "ease or difficulty with which the information could be properly acquired or duplicated by others." Because if a trick is published in several books, it's easy to acquire the information.

Copyrighting Magic

Although the federal Copyright Act of 1976 protects original "dramatic works" and "choreographic works," you can't currently copyright a magic trick.

You can only copyright the "pantomimes" surrounding the trick. That's what Teller (of Penn & Teller) did with his "Shadows" illusion. When a Dutch magician started selling a knockoff version, Teller sued him for infringement, even though international litigation can get messy. The suit wasn't about revealing the props' secrets; it was about the stolen choreography.

But should it be?

Let's say I invent a Magic Jacket. I show both sides of the jacket, front and back. Looks totally normal. I slip the jacket on and zip it up. I pull its hood over my head. Then I put my arms behind my back. I pause. And then, as if possessed, the zipper unzips, the hood flies back, and the jacket peels itself off my shoulders and drops to the ground. (Applause here.)

It's a trick jacket, obviously. It looks normal, but it's got all sorts of wires and bands and electronics inside. I might spend years testing and perfecting the mechanics, but when I go to the copyright office, the only thing I can protect is the bit about showing both sides of the jacket and the bit about putting my arms behind my back.

Now let's imagine a rival magician steals my trick. Performs it on TV, on YouTube, at a theater next to mine. So I head to court to enforce my copyright. I tell the judge, "He's showing both sides of the jacket and he's putting his arms behind his back! That's my copyrighted choreography!"

My rival can defend himself with the merger doctrine. He'll say that my choreography is the *only* way to do the jacket trick: He has to show both sides of the jacket to show that it's (ostensibly) normal. *Of course* he has to put his hands behind his back, so his audience doesn't think he's unzipping the jacket from the inside. He'll argue that he *can't* perform the uncopyrightable trick without the copyrightable choreography, and that he's therefore not liable for infringement. And his argument will probably hold up.

This is like saying: It should be legal to bring a gun to a bank robbery because you *need* a gun if you're going to rob a bank effectively, so, actually, let's just make the whole robbery legal.

Look at it like this: You can copyright a choreography, and you can copyright a dramatic monolog, and a magic trick is just a combination of the two. It's a series of particular movements—close-up magic is choreography of the hands—with a series of

particular words. Just because some tricks incorporate special props (as the Magic Jacket trick would) doesn't mean they should be less protectable.

The special prop alone is not the "work"; the "work" is a combination of the prop and what you do with it. In magic, the two are inseparable. If you've got a Sawing a Woman in Half box, the only thing you can do with it is make it look like you're cutting a girl in two.

So what can magicians do? Is there any hope for magicians protecting their intellectual property?

Maybe. Hope may lie in Trade Dress law, which could prevent one magician from copying the look and feel of another magician's show. (Think back to the Apple/Samsung lawsuit—that's Trade Dress law.)

Or maybe hope lies within the magic community's informal, internal policing. That's what attorney Jacob Loshin argues in his paper "Secrets Revealed: How Magicians Protect Intellectual Property Without Law."

Loshin points out that good magic secrets are hard to come by, and that the penalty for improperly sharing them, while not court sanctioned, is severe.

And lastly, maybe hope for the magic community as a whole lies in the illusions that haven't yet been created—in innovating the art form.

At least, that's what Copperfield thinks: "I believe it's possible to achieve justice in the American court system, but it takes a lot of time, energy, and money. It's not always [illegible] focusing important bandwidth on that when you can [illegible] the same time and energy to creating something new [illegible] different."

Critical Thinking

1. Describe why it is difficult to successfully sue when a magic trick is stolen, despite the existence of several forms of intellectual property law. Proffer an argument as to the best ways for a magician to protect his/her IP.
2. Research online how IP law works in the fashion industry and compare its use in fashion to its use in magic. Why is IP law applied differently in different industries?

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