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# BR

# TECHNOLOGY

# WHAT'S NEXT?



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# ABOUT iBR

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The International Business Review is the only undergraduate print publication from the University of Pennsylvania's Wharton School. Going beyond the scope of the American economy, IBR is region-based and covers a diverse array of business trends. IBR features internationally relevant articles written by University of Pennsylvania undergraduates and interviews with international business executives. With every issue, we aim to bring a global vision to the business world.

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The Wharton School of the University of Pennsylvania — founded in 1881 as the first collegiate business school — is recognized globally for intellectual leadership and ongoing innovation across every major discipline of business education. The most comprehensive source of business knowledge in the world, Wharton bridges research and practice through its broad engagement with the global business community. The School has 5,000 undergraduate, MBA, executive MBA, and doctoral students; more than 9,000 annual participants in executive education programs; and an alumni network of 88,000 graduates.

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The Wharton **International Business Review** is the Wharton School's undergraduate international business publication, delivering global business insight from Penn undergraduates, faculty, and top executives.

One of our favorite aspects of Wharton is its focus on driving innovation and creating value around the world—and so we're thrilled to present our Fall 2012 issue with a focus on global technology. As economies develop and globalize, technology leads the way—and this issue of IBR reflects that. This issue, our writers provide insight on topics from mobile banking in Africa and the trends of Silicon Valley to innovation in Brazil and app development in the Middle East. This issue also features interviews with executives from Pixar, Corning, and Shopilly; our faculty insight page; IBR's favorite things; a local hero changing the world; and a special guest article by Philippe Clary of Tesla Motors.

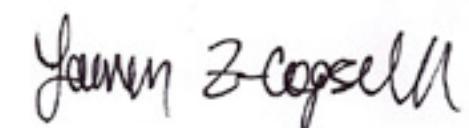
Yet even more exciting are the changes we're making behind the scenes. Our team, a dedicated and brilliant group whose interest in global business is surpassed only by its passion for growing IBR into a fantastic publication, has some great tricks up its sleeve. We're expanding our distribution to cover major universities and cities across the U.S.; introducing global subscriptions; and revamping our website at [ibrmagazine.com](http://ibrmagazine.com). We're also ecstatic about IBR's "Issue in an Afternoon", an event in Spring 2013 that promises to deliver the knowledge and entertainment of an entire issue of IBR in one afternoon.

With that, we hope you enjoy reading IBR as much as we enjoyed creating it, and thank you!

Sincerely,



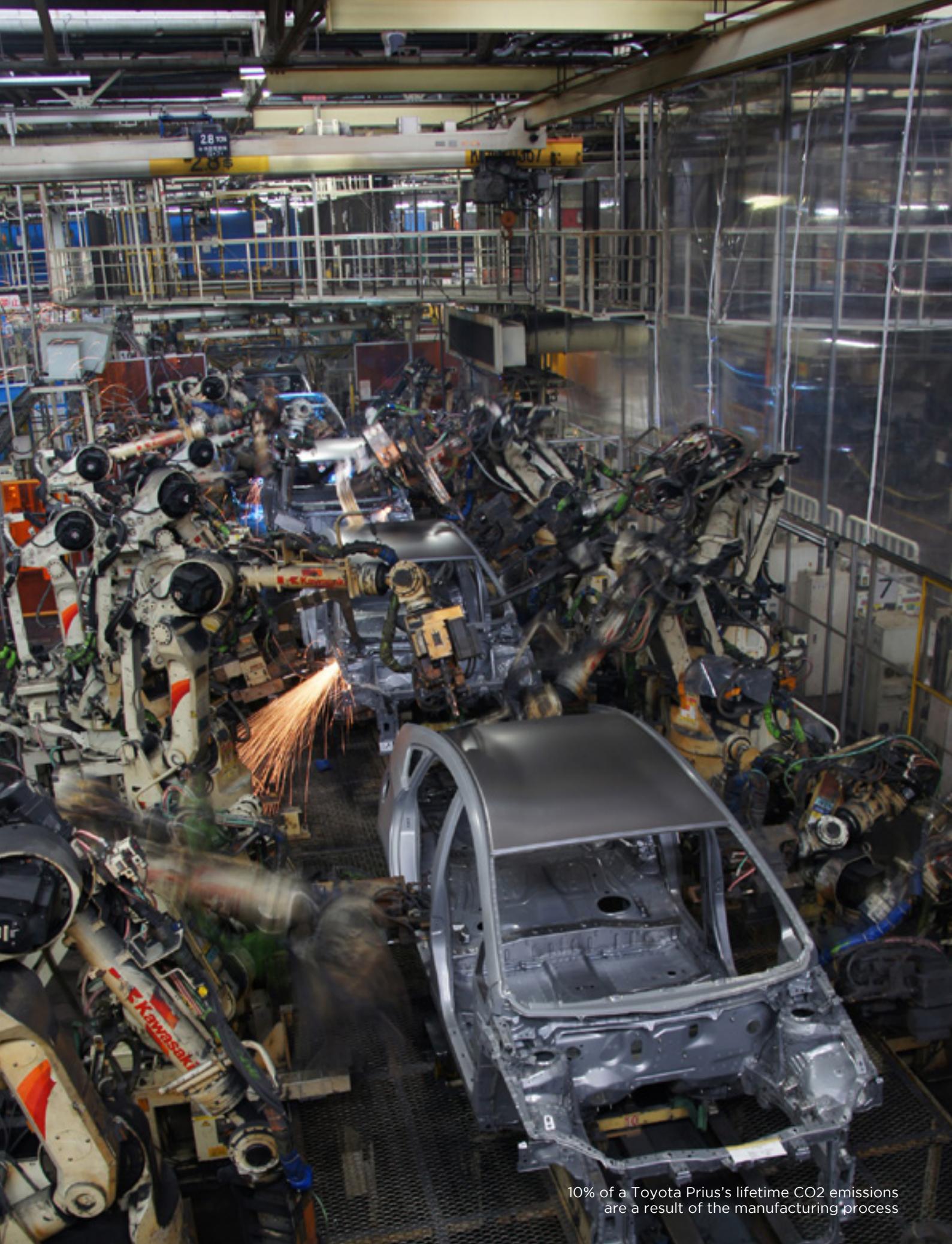
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10% of a Toyota Prius's lifetime CO<sub>2</sub> emissions are a result of the manufacturing process

## EDITORIAL

# A Shock of Green

BY ALEXANDER BROWN W'15

Prius or Hummer? It depends. Are you going for toughness? Then Hummer. Moving with the times? Prius. Feeling overly aggressive? Of course, Hummer. Want to save the planet? Hummer.

Not a typo... For those who are looking to purchase a car and be green at the same time, the best choice out there might not be what you would think of first. Contrary to common misconception, the Toyota Prius, with over a 109,000 Toyota-estimated average lifespan, is actually less environmentally friendly than a 2006 Hummer H2.

Most of the problem with the not so eco-friendly nature of the world's premier hybrid automobile however, is not in the actual process of driving the car to and from the supermarket, work, or soccer game, but in the manufacturing and disposal process of the car pre and post-use. More specifically, the manufacturing and disposing of the car's battery pollutes the air with CO<sub>2</sub> and nickel on a scale that would horrify even the most casual supporters of the green movement.

The Toyota Prius engine unit uses a 32-pound nickel battery system, nickel being one of the most challenging and dirtiest mining processes in the world. The mining occurs in Sudbury, Ontario, after which the nickel is trucked to the western coasts of Canada and shipped, at great economic and environmental expense, across the Pacific Ocean to Tsutsumi, Japan ("Toyota City"). The two-week long process of building a Prius battery pack then begins before the battery is inserted into the car's frame. After the entire car is complete (keep in mind that manufacturing the Prius without a battery still accounts for 10% of the lifetime CO<sub>2</sub>



The Hummer's per mile lifetime cost of energy is \$3.03, \$0.22 less than the Prius.

self on efficiency. While the Prius boasts 45 miles per gallon, the Hummer struggles to achieve 15 miles per gallon; however, the premier automotive research team at the BBC estimated that the Prius had a per mile total lifetime cost of energy of \$3.25 and the

**“ THE TOYOTA PRIUS, WITH OVER A 109,000 TOYOTA-ESTIMATED AVERAGE LIFESPAN, IS ACTUALLY LESS ENVIRONMENTALLY FRIENDLY THAN A 2006 HUMMER H2. ”**

emissions of the vehicle), the final product is shipped around the world, again at great environmental cost, sometimes back to Canada, or other times to places like the United Kingdom, South America, the United States, and Australia.

The Hummer, by comparison, does not make use of a high-voltage battery hybrid system and all components of the massive truck are built in the United States. Transportation costs within the production process are negligible and the process itself, designed and operated by General Motors, is one that prides it-

Hummer a \$3.03 per mile lifetime cost of energy. Certainly considering the production process and per mile lifetime cost of energy, the Hummer is actually the greener car. However, it is important to note that Toyota estimates the lifetime of a Prius to be 109,000 miles. If one were able to drive their Prius for longer than this estimate, they would eventually far exceed the efficiency of the Hummer. In fact, after 200,000 miles, the Prius's per mile total lifetime cost of energy is \$2.67. Until then, you may as well drive your Hummer to pick up the groceries.

# Power Supply: Building a Tesla

BY PHILIPPE CLARY DUKE UNIVERSITY '12 PURCHASING SPECIALIST, TESLA MOTORS

*"Revolutionizing and disrupting industries is not for the faint of heart."*

-Elon Musk

100 years ago, the Ford Model T was ramping up production at the new Highland Park Manufacturing Complex. Ford's shift to Highland Park allowed vehicle production to increase from 10,000 Model T's per year, to 9,000 vehicles per month in the course of 5 years. The success of the Model T was more than just engineering design or good marketing; mass production allowed millions of consumers to easily access a disruptive technology.

Meanwhile, electric vehicles have not been easily accessible to consumers. For the greater part of the 20th century, gasoline-powered vehicles were the primary choice of transportation for most Americans. The dominance of gasoline-powered vehicles over electric vehicles can be attributed to three major areas: lower development costs, infrastructure commercialization and consumer diffusion. Combined with the lack of any industry disruptors, electric vehicles remained dormant for the 20th century.

The 21st century automotive industry is already reversing the dominance of gasoline-powered vehicles. Although alternative-fueled vehicles account for less than 10% of the one billion vehicles in oper-

**“THE MARVEL IS NOT IN THE BUILD OF A SINGULAR TESLA MODEL S, BUT THE MASS PRODUCTION OF HUNDREDS PER WEEK.”**

ation, this small segment is growing. The challenge to alternative-fueled vehicles remains their stigma - a transportation compromise for consumers.

In 2004, a group of Silicon Valley engineers decided to disrupt the design of automobiles by forming Tesla Motors. Tesla's primary goal is to create premium performance electric cars to help decrease dependence on hydrocarbons without compromising on overall driving experience. From this, the Tesla Roadster concept was born, which combined the nimble handling of the Lotus Elise with driving efficiency exceeding the benchmark Toyota Prius. Consumer compromise was not an option in CEO Elon Musk's mind - Tesla was not *just* going to build electric cars, it was going to build the best cars in the world.

Fast-forward to 2010 and Tesla was in full production of the Roadster - a good start for disrupting the automotive world's definitions of 'efficient' and 'performance'. The Roadster's tour de force was the cutting edge powertrain - a lithium ion battery pack mated to a 3-phase DC electric motor redlining at 14,000 rpm. The combination of technology allowed the Roadster to impress range-anxious drivers and petrolhead enthusiasts by delivering a 0-60 time of 3.7s and range of 245 miles. The distinguishing feature of the Roadster was not the

performance or efficiency, but rather that it accomplished both feats without the direct consumption of petroleum.

The Roadster was a successful proof of concept for Musk's premium electric cars; however, it was not without its shortcomings. It carried a high sticker price, only accommodated two people, had little trunk space and still took hours to recharge. It was not a practical choice for daily drivers. Tesla may have turned heads and caught the media's attention with the Roadster, but 2250 Roadsters were not going to disrupt the automobile industry. A mass production vehicle would be required.

Musk understood the initial high costs of new technologies, particularly with something as complex as electric cars. Tesla's strategy was to enter the high end of the market, where customers were prepared to pay a premium, and then drive down the market with higher unit volumes and lower prices with each successive model. Just like the Model T, which was not the first vehicle Ford Motor Company produced, Tesla Motors would have to design and mass-produce an affordable and consumer friendly automobile.



Images from top to bottom: Model S Front, Model S Interior, Model S Rear

methods.

Before a Model S is assembled, thousands of unique parts and material have to be delivered to the Tesla factory. Supply chain has a tremendous job of sourcing and coordinating logistics for a product as complex and groundbreaking as the Model S. Currently, the customer delivery "lead time" for a Model S is over a year due to the customer waiting list. But the building of a Model S is an event that takes place over the course of several months in three phases: inbound, production and outbound.

The inbound phase involves the purchasing and delivery of raw materials and parts to Tesla's factory. Every raw material or purchased good has its own lead-time, which must be factored into the build of a Model S. For example, if a Model S is scheduled to begin production on February 1st, 2013 and a particular raw material such as aluminum requires a 16-week lead time, supply chain must execute purchases mid-October 2012. Once in full production mode, Tesla's suppliers operate with shorter lead times, allowing for more nimble changes to the build schedule.

Once material and parts arrive at Tesla, the production phase takes over. On the vehicle side, production of the Model S begins as a large rolled coil of aluminum. The aluminum is flattened and fed into a blanking line where the individual sheets for parts are blanked out. The blanks are handled by Kuka robots that position them into different press lines to punch out the variety of parts that comprise the sheet metal and chassis of the Model S. The aluminum parts are distributed down the main production line in Body in White (vehicle assembly prior to painting). The last part comprises of more robots and workers who assemble the chassis and body pieces before the vehicle heads through the paint shop.

On the powertrain side, production has dozens of smaller separate assembly lines building the various drive units. Production lines cut down the time needed to make a complex drive unit and also allow for increased quality per unit as assembly is streamlined for minimal human contact. The many powertrain units come together as each assembly is another part of a larger sub-assembly that makes up the completed Model S.

The final phase, outbound, occurs once the Model S is finished and has been approved by quality control. The completed Model S is wrapped up and packaged for delivery and loaded on a truck bound for the delivery destination. Shipments of vehicles are sent out in location "hubs" to ensure route optimization. From the hubs, specialized delivery occurs, as each Tesla customer is allowed to pick any delivery location within the US.

In the big picture, Model S production is not a linear operation. The product launch occurred in June of 2012 with the target of 5000 vehicles by the end of the year. To accomplish this goal, Tesla's operations are ramping up while balancing quality and supply. At the beginning stages, a few Model S vehicles were built each week, with a laser focus on quality. Yet within a couple of months, weekly production expanded 20x, to be on track by the end of October to have weekly production rates in the hundreds. If all goes according to plan, production will increase again by 5x by the end of the year, putting production rates at over 500 vehicles a week.

When placing the production and growth of the Model S in perspective, a good benchmark is another disruptive technology: the Ford Model T. Ford Motor Company's success was a combination of a game changing product, efficient mass-production and accessibility to the public. The marvel is not in the build of a singular Tesla Model S, but the mass production of hundreds per week. The success of a disruptive technology, like the Model S, will only be as successful as it is accessible to the public. Mass production, or the process of making many copies of products, quickly, using an assembly line to streamline individual production steps, is the hallmark of a successful, disruptive product.



**INTERVIEW:** Anirban Datta, Founder and CEO of Shopilly

**“ TALENT IS WHAT WILL GET YOU STARTED,  
BUT PASSION IS WHAT WILL HELP YOU SUSTAIN  
IT FOR A LONG TIME.”**

# Anirban Datta and Shopilly: A New Age of Shopping

INTERVIEWED BY JAMES CALVO W'15

Anirban Datta is the Founder and CEO of Silicon Valley-based tech startup Shopilly, an innovative new start page for shopping. An MBA graduate of the Wharton School in San Francisco, Mr. Datta has extensive experience with e-commerce platforms, including serving as Architect at Blue Martini Software and Senior Product Manager at eBay. Shopilly has engaged Wharton on a number of levels, including placing two Wharton professors on its advisory board and retaining Wharton's undergraduate marketing consulting group MUSE. We sat down with Mr. Datta to get his thoughts on Shopilly, the startup space, and his experiences with technology and entrepreneurship.

**I**nternational Business Review: Shopilly is a promising new startup. Can you describe exactly the nature of the venture? How did you see the market opportunity for the product, and where does it differentiate itself from the competition?

Anirban Datta: Shopilly is your start page for your shopping. When it comes to my social life, I use Facebook as my start page, and LinkedIn as my professional start page. It's a big space for shopping—\$3 trillion in U.S. retail sales every year. There isn't a really elegant, personalized start page today. So there's Amazon—it's a great company, but it does not represent online brands and retailers, or the product interests I have. And there's Google, which is primarily still a search engine, not at all personalized, and definitely not visual, which shopping should be. So fundamentally I think there are three things that need to be in the start page. The first is that it needs to be personalized—it's got to be something I can relate to, because my brands, history, and preferences need to be there, across categories from clothing, to electronics, and everything else. Second, it needs to be visual, because shopping is visual—and most aren't. We're seeing with the growth of Facebook and Pinterest and others that people experience “visual” a lot better. And third is mobile—since 90% of our shopping still happens in the physical world, how can I have a solution with me that allows me to be more productive, effective, and joyous in that physical shopping experience in stores? So we envisioned Shopilly in these three contexts, and we immediately personalized, because Shopilly is not only a visual experience about the brand and its

offers, it's about you and your brands and preferences. And our mixtures is very mobile, aiming to bring this valuable information into the physical shopping space. So if I see offers from Macy's or Anthropologie, whether it's through email or Shopilly, how can I recall and access that information when I'm in the mall? That's kind of what Shopilly is.

**IBR:** You've jumped from different software firms and into launching your own startup. What made you make that move?

AD: I've been in the technology world for over a decade now. I've worked primarily in e-commerce companies, in eBay, and before that a company called Blue Martini Software, which was the leading provider of e-commerce software to companies like Saks Fifth Avenue, Nordstrom, and others. I've also been in other companies that have provided shopping rewards and similar. So I feel very passionate about the space, and I've been in different operating roles, from technology to marketing in the space. While shopping itself is a very big space, the experiences around shopping haven't quite popped in the last 15 years. We anticipate there are going to be some very interesting things going into the future, a lot of tailoring to make that happen. And we've seen opportunity and brought fresh thinking to Shopilly, and based on my background and network, I think I've been able to make the transition from doing what I used to do to building up this company.

**IBR:** What were the biggest factors of consideration in launch



The Wharton School in San Francisco, CA.

ing your own startup? What have been the greatest challenges and rewards?

AD: I think the most important factor, and I think most entrepreneurs would agree, is that it really comes down to whether you have passion for it. Do I really care about this? Do I really want to create something amazing? Because you're building something not just to build a company and hoping it becomes big, but you also want to build something that is bigger than you—and that's my primary goal with Shopilly. It's a space I'm passionate about, I really want to build something bigger than me. And then of course come the questions of whether it's the right space, is it big enough? Retail in the U.S. is huge, one of the biggest markets in the world. Have there been changes in technology? With retail, absolutely. It's about connecting the dots and going ahead with it, but it comes back to your passion and your hunches as you start to gather more and more data and you start to build on it.

IBR: Do you think the start-up culture we hear so much about holds true at Shopilly?

AD: Absolutely. It's extremely fast-paced—I've been in big corporations and smaller firms, and what sets us apart is the energy and passion that's absolutely paramount. That's what drives people to startups. It's very infectious: if I am passionate, then others

catch onto that and that's how we build. And the agility and the fast pace are extremely important because, unlike big companies that have lots of people and lots of priorities and budgets and structures around that, we essentially win when we can move very fast. We can make decisions and execute very quickly. What would normally take a company a year to execute, we can do in a month or less. That speed of execution and being very fast in our work is what allows us to innovate and eventually win.

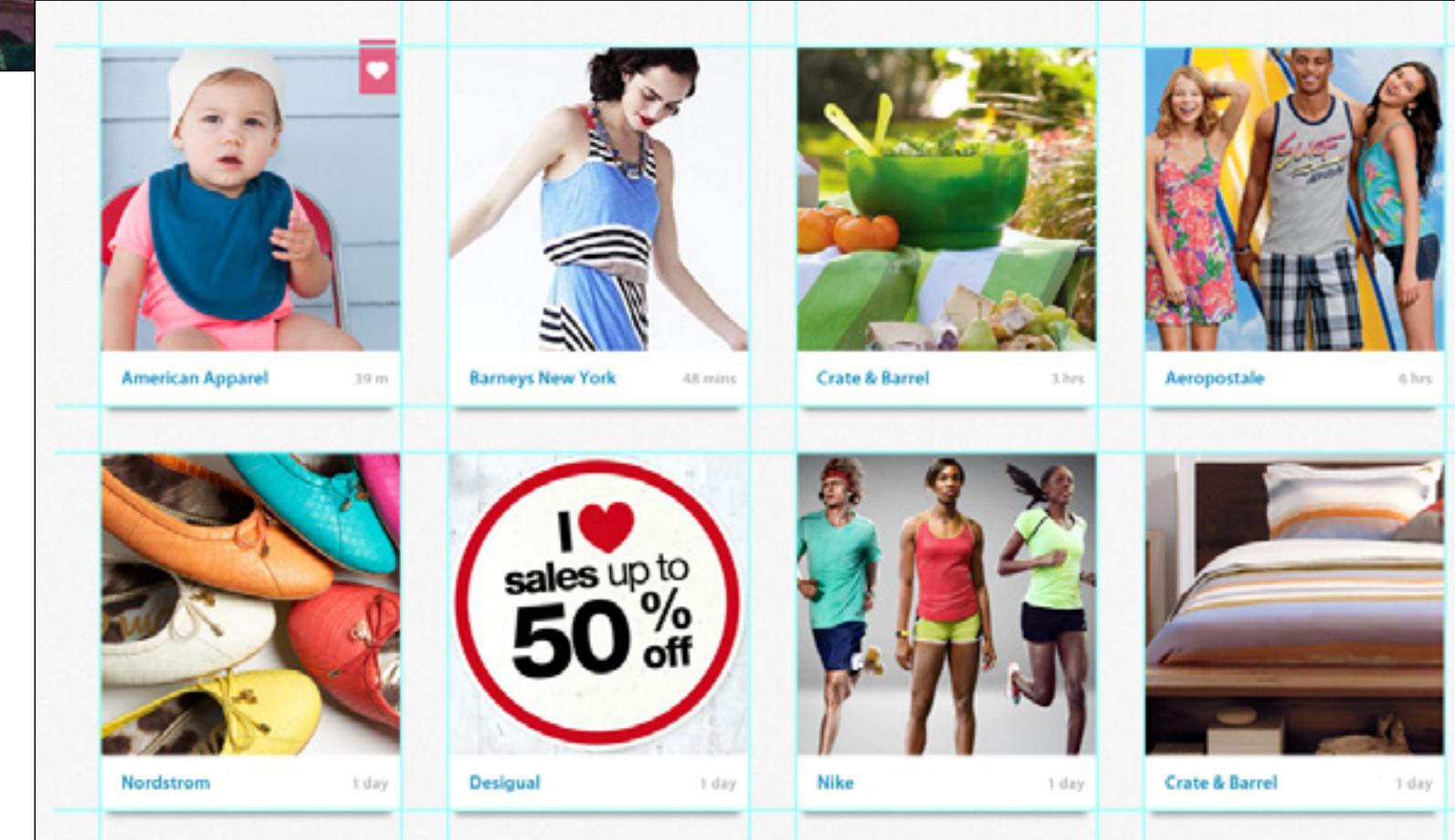
IBR: After the Facebook IPO in May, and the disappointing results of Groupon and Zynga, have you noticed a change amongst your peers and your funders in the attitudes towards funding, going public, or the outlook?

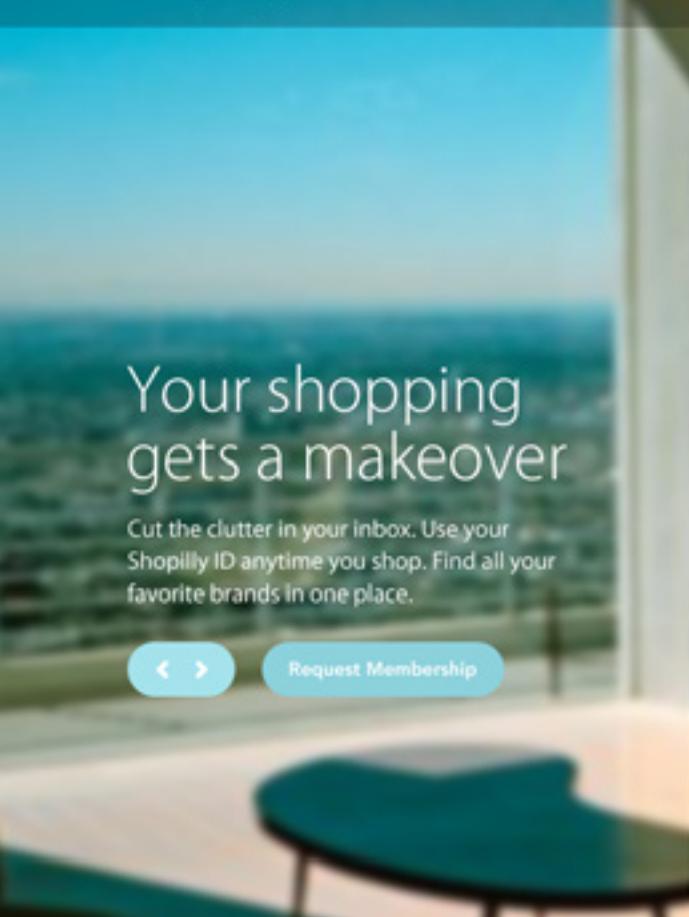
AD: I don't think you can read too much into that data. Personally I love Facebook, Twitter, Pinterest—they're all great. It's hard to read into what the real value of Facebook is, whether the revenue multiples are justified. I think the market tends to correct itself (the joy of free markets), but when it comes to venture capital, I think this is as lively as you'd ever imagine it could be. There is perhaps a bit of a shift towards supporting business that have sustainable business models and paths to monetization; but at the same time, they're looking towards the future. And VCs are making big bets about the future.

## The application. One grid to rule them all.

The main objective of the design was to maximise the area the user gets to interact with the products on display and to make all interactions as easy to understand as possible. To do this we had to constantly ask ourselves if a feature was really necessary. Although painful at times, feature-cutting and creative thinking allowed us to create something truly simple.

Creating an application isn't as easy as it used to be. There are devices and operating systems galore. This reality has created a huge hurdle for entry, especially for small teams. With only a handful of employees, Shopilly had to take all steps available to simplify the design and coding process. The grid is consistent across the iPad and web applications. And since it's modular we can adapt it to each screen size, utilising each users maximum interaction area. This approach also has a big upside for the user. Users don't want to learn new ways to interact with their applications just because they switch from mobile to desktop. Taking an holistic approach, thinking about touch and desktop throughout, helped us create a seamless user experience across devices.





A mock showing of the Shopilly app homepage.

IBR: One of the biggest questions investors have for is monetization of startups—at what point does the focus turn to monetization, and how is Shopilly facing this challenge?

AD: Well part of my background is at the Wharton School, so I think about business models as well. Fundamentally I think if we build a solution that adds value to both consumers (which Shopilly does), and also value to the brands and retailers (which

“ THAT SPEED OF EXECUTION AND BEING VERY FAST IN OUR WORK IS WHAT ALLOWS US TO INNOVATE AND EVENTUALLY WIN. ”

it does), then monetization is very natural and built into Shopilly. The goal is always to create a really amazing solution that delights consumers, and if it ends up driving more sales, promotions, and awareness, there's a clear way to have revenues coming in for us because we drive actions. Unlike say, if you're a social media network, where the primary goal of visiting the site is to learn about your friends and family and weddings and everything, it's a much different mindset from when people interact with Shopilly because it's about shopping. That difference in mindsets is a clear differentiator for us, so we have a number of simple, clear ways to monetize the platform.

IBR: You went to undergrad in India, but moved to California and ended up at Wharton San Francisco. What were the biggest things you took from both schools?

AD: My undergrad experience was as technical as it can get, and that's really helped me so far, even in building Shopilly. I can be part of very technical discussions here. But what my business school education has given me is the framework, to really see out-

side it. Fundamentally, you don't want to build technology just for the sake of it. You want to build it because there's a business model there, and with that framework you can start to better understand the ecosystems. For example, in Shopilly we know the three constituencies of the Shopilly ecosystem are the shoppers, the retailers and brands, and the media companies. With Shopilly, with all our technology, we're looking at how we connect the retailer to the shopper via the media. We're looking beyond Shopilly.com—where else can we connect the shoppers to the retailer? That requires an understanding of how the ecosystem and value chain works—that's where the business school education comes

in. That's in addition to the networking; Wharton's a great school, and a lot of Wharton alums are in the Bay area in the industry. I've been very fortunate to get a lot of really good support from Wharton-affiliated people, from my classmates to professors. Two of my Wharton professors are on my company's advisory board, for example.

IBR: We hear a lot about Wharton San Francisco. Did you feel connected to Wharton and Penn in Philadelphia, and have you noticed any differences between the two campuses?

AD: Well, during my time at Wharton San Francisco, we did make a trip to the main campus. It was great—Penn has so much history and such a collegiate, academic setting. They do fly all the professionals in to Wharton San Francisco, but what I got out of it was those professors who are now on the advisory board of Shopilly. I was able to travel to the main campus a few months back to a retail conference which I was fortunate enough to be invited to, and that allowed me to relive the experience through the main campus. If I had the chance to spend a few years at Penn, I'd absolutely love the opportunity. But even being on the west coast, there's always some degree of connection.

IBR: You've been involved with MUSE Consulting at Penn, and some of your advisors are involved at Wharton. How has Wharton impacted Shopilly?

AD: MUSE has been awesome for us. I got to know MUSE through one of Wharton's marketing professors who's on our advisory board and has been a great supporter of Shopilly from day one. He had worked with the MUSE students before, and he brought them up. We've actually reengaged MUSE this semester because we were so happy with their work last semester. MUSE has really helped us in our very early days when we were validating the platform—is there a need for a solution? How do people describe the need? How do people react to Shopilly? So a lot of qualitative and quantitative research was done by MUSE. It also helped us in identifying tactical stuff in our product launch. Now that we've launched, we've reengaged MUSE, and it's more about the process level and awareness generation, and thinking about who we work with in the ecosystem.

IBR: Entrepreneurship is an increasing focus of Wharton, as students consider alternatives to finance and consulting. As someone who has worked on both the corporate and startup sides of business, what's your advice for students looking to get into the space?

AD: It depends—every startup is different. For me, I don't think entrepreneurship can be taught. It's not a technical discipline, and though cultivation helps, to connect the dots you need the intuitive sense. How good are you at recognizing the patterns? From that perspective, I think your business school education definitely helps in connecting that which doesn't seem directly connected. But fundamentally, it boils down to passion and talent. Talent is what will get you started, but passion is what will help you sustain it for a long time.

## AIRBAN DATTA



Anirban Datta is Founder & CEO of Shopilly, a consumer eCommerce company. Datta received his MBA from University of Pennsylvania's Wharton School in San Francisco, CA. Prior to that he received his BS in Computer Science from Jadavpur University in West Bengal, India.

Before founding Shopilly he held varied senior operating roles in eCommerce and online media companies. Some of his past roles include Senior Product Manager at eBay, VP Product Management at MyWire and VP Marketing & Product at Lealta Media.

During his time at eBay Datta was a lead product manager for platform for distribution and developer apps in addition to co-leading the Skype integration project. As VP Product Management at MyWire he launched destination site for consumers, monetization and distribution services for premier publishers such as the Wall Street Journal, Forbes, BusinessWeek, and Gannett and Hearst.

On October 1, 2012, Shopilly, the 8-person startup company founded by Datta, was launched to the public. Since then it was been featured on NBC News and MSNBC Business, FastCompany, and by the San Francisco Chronicle.

# Brazil: A Need for an Innovative Approach to Innovation



BY VICTOR ALVES W&C'15

In modern and increasingly globalized times, current disparities in knowledge level and production advantages among different countries are likely to wane. The Brazilian government has seized the opportunity after the financial crisis to foster innovation in the domestic market. However, there are still many issues that need to be addressed for the country to ensure its status as a truly innovative powerhouse in the future.

The Brazilian president, Dilma Rousseff, emphasized in her inaugural speech that Brazil has "made strides in research and technology, but we need to go much farther." Capitalizing on the relatively stable macroeconomic environment, the president has supported advances in technology and the sciences to ramp up productivity. It seems like the primary impetus for the creation of the necessary infrastructure and policy reform has been laid.

One of the government's primary concerns Rousseff has tried to address lies with the education system of Brazil. A highly skilled workforce is necessary to ensure future economic development. Yet the domestic education system cannot meet Brazil's demands for a skilled workforce: the Global Innovation Index (GII) has ranked the nation as the 115th country in the world in terms of tertiary education. In fact, a number of national firms, such as Petrobras and Vale, as well as the companies under Eike Batista's EBX group, have expressed a lack of success in finding enough engineers for their operations. Brazil has produced about 40,000 engineers a year, compared to India's 250,000 and China's 400,000. The country's skill shortage has prompted the government to pass the Sciences Without Borders program, an incentive for graduates in the Science, Technology, Engineering, and Mathematics (STEM) subject areas to study abroad under the government's financial aid. The policy, which was passed last year, will sponsor a total of 100,000 scholarships for Brazilian students. However, the lack of a

skilled workforce hampers the development of Brazilian industries and paves the way for foreigners to work in the domestic environment. All in all, Brazil is currently ranked as the 58<sup>th</sup> most innovative nation in the world.

There are other occurrences that demand better oversight by the federal government. Brazil has effectively instituted a compulsory affirmative action for one half of all open spots in federal universities, which are generally regarded as the best in the nation. This could be destructive for the nation in the short run, as it may result in lower-quality students graduating college and leading to a less skilled professional base. Brazil has also markedly increased civil servants' salaries since Luiz Inácio Lula da Silva's first presidential term ten years ago. Even top students in engineering programs in Brazil value working as civil servants due to the positions' stability and well-paid salaries, which can be twelve times the value paid by the private sector.

Another primary concern centers on Brazil's difficult business environment, as the Latin American giant is ranked 127<sup>th</sup> in this category by the GII. Brazil, which is known for its overcomplicated and corrupt bureaucracy, has also seen the need to create the necessary policy infrastructure to foster innovation. Dating back to 2004, the Law of Innovation was created to facilitate interactions between private firms and public institutions. Two years later, the Law of Goods provided fiscal incentives for companies to invest domestically in Research and Development (R&D). While the number of patents submitted in the country has continuously grown over the years, the approval process can still last for up to eight years. Brazil's patenting office only accepts about two percent of all patents—a figure that is around ten times higher in both China and India. Additionally, only about two percent of Brazilian firms cooperate with universities or other higher education institutions to encourage innovation; in Russia, this statistic is nine percent.

In line with past percentages, the amount of Brazil's GDP spent on R&D has grown slightly but remained at around one percent. Brazil's historically high interest rates have hampered the growth of credit and investment from domestic firms. Rousseff's administration has brought down the Central Bank's benchmark interest rate 500 basis points to 7.25% since the rate's peak in June 2010. Some hope lies in the expectation that the domestic industry will utilize the lower interest rates to borrow and fund more R&D spending while maintaining low default rates.

Despite mixed results, the Brazilian government and the country's favorable economic prospects, such as sustained growth and a large domestic market, have attracted large international firms to construct R&D centers in Brazil. Fiat and General Motors, two large automobile manufacturers, design and produce models in the country. General Electric, Google, and Cisco have each spent or promised to spend hundreds of millions of dollars in implementing R&D centers. Cisco, for instance, will devote the equivalent of one billion reais, or about 500 million US dollars, over four years in a center geared towards developing technological solutions for its Brazilian customers.

Brazil has also become a hub for startups. The first technology parks, created in the 1980s, were organized by the National Council for Scientific and Technological Development (CNPq), a government organization. There currently are about 75 technology parks around the country, as well as 400 incubators and 6,300 startups found in various stages of development. Technology parks provide for a collective arrangement of tasks, where accounting, marketing, sales, and other needs of normal companies are adjusted to synergistically benefit all the startups.

Some Brazilian firms have done decently well in innovation. Bug Agentes Biológicos and Boo-box were ranked as two of the Top 50 Most innovative Companies, a list compiled by Fast Company that includes large companies such as Apple, Facebook, Chipotle, NFL,

and others. The startup scene in Brazil has been dominated by Internet companies, such as Peixe Urbano, a site similar to Groupon, and Buscapé, a site for comparing goods' prices. Petrobras continues to research and develop new techniques for deep-water drilling. Moreover, some international startups count with Brazilians among their founders, such as Facebook's Eduardo Saverin and Instagram's Mike Krieger.

Over the last few years, Brazil has garnered support from international venture capital and private equity firms, though at a slow pace. This has been due to investors' skepticism toward the Brazil's tax code, which requires companies to pay 67 percent of their profit in taxes, a slow bureaucracy, and inflexible labor laws. Brazil is consequently behind China and India in venture capital investments. Despite some negative prospects, the Latin American nation provides a strong domestic consumption base, a modern – though often inefficient – legal system, and a promising economy. Definitive actions by the Brazilian government to revert these trends would provide a reassuring message to VC investors.

Had an article on the subject of innovation in Brazil been written five years ago, its tone would have been very different. Brazil has recently asserted its position as a global player in political and economic matters and has become the sixth largest global economy after recently surpassing the United Kingdom. The country survived the 2008 crisis largely unscathed—even though its economy's prospects for growth in 2012 are at about half a percentage point. Though Brazil has become a regional power, it largely relies on commodity exports for economic growth. The country's future will lie in its ability to improve a decrepit transportation system, explore an emergent domestic market, reform the education system and business environment, and create new sources of income by enhancing private sector innovation and competitiveness. While Brazil still has a long way to go with respect to becoming an R&D powerhouse, it seems as though the country has taken the first few steps towards achieving a bright economic future.

“ BRAZIL IS CURRENTLY RANKED AS THE 58TH MOST INNOVATIVE NATION IN THE WORLD.”



The president - Dilma Rousseff - with the richest businessman in Brazil, Eike Batista.

# Demystifying the Cloud

BY ALLISON COLLINS W&C'15

Cloud computing is one of the latest buzzwords in technology and business, yet few actually know what it constitutes. It is a catchall phrase used to describe the delivery of computing resources – which range from applications to data storage – over the Internet that are shared, paid for on a per-use basis, easily scaled, and abstracted from the user. Cloud technology can be distilled into three main delivery models and three main implementation models. The delivery models include Software-as-a-Service (SaaS), in which software is offered via private networks and the Internet, Platform-as-a-Service (PaaS), in which computing services are provided for companies to develop and test applications and services, and Infrastructure-as-a-Service (IaaS), which offers virtual servers and storage. With respect to implementation, the cloud is segmented into private offerings, where services are managed and used internally, public offerings, where services are shared across multiple data centers and users, and hybrid offerings, where some resources are managed and provided internally while others are externally. As such, its offerings are somewhat complex, yet the multitude of ways in which it can be implemented and delivered comprises its key strength globally.

Across American, European, Asian, and Latin American markets, the key characteristic cited for use of the cloud is its potential for “speed and agility.” Specifically, studies have shown that within Africa and the United States, the feature considered most desirable is the ability to standardize business procedures, whereas in the other markets it is the ability to quickly scale resources up or down. Price is not one of the primary considerations in either instance. However, examining cloud technology in a global sense quickly

results in a paradox: cloud technology is not as widely integrated in what would be traditionally termed developed markets as it is in developing markets, yet it is from developed regions that such technology emerges.

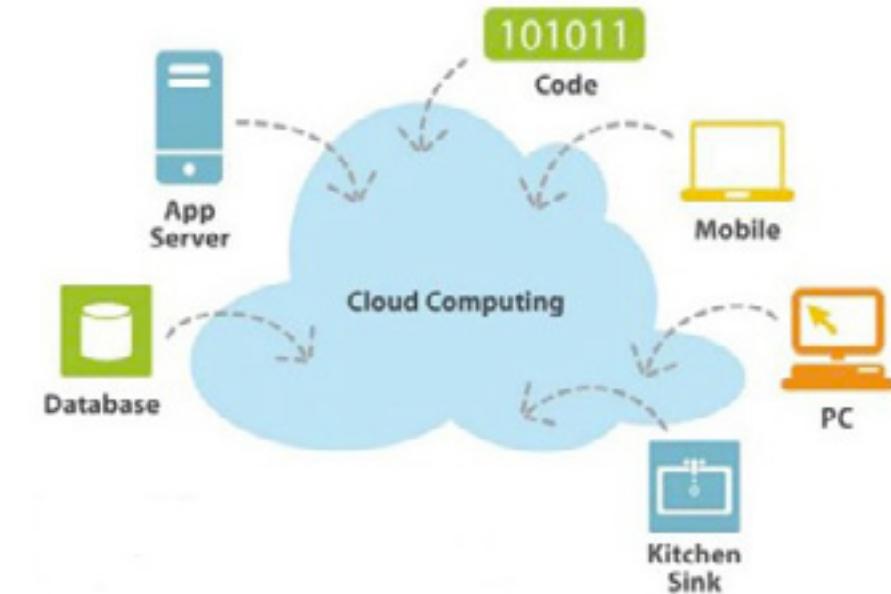
Exhibit II-1 illustrates how cloud technology is not as widely used in the US and Europe as it is in Asia-Pacific regions and Latin America. However, companies often cited as the leaders of cloud computing - Amazon Web Services, Google, IBM, RackSpace, Microsoft, Cisco, Apple, and Oracle – are US-based; some European leaders are also prevalent in the marketplace, such as the German SAP. The elusive result is a disconnect between where cloud computing is being created and where it is being more openly received and implemented.

Latin America and Asia have willingly embraced cloud technology because of the aforementioned core competency of speed, coupled with its low implementation cost. Moreover, another factor often cited is the difference in the IT environment between developed and undeveloped markets, as is witnessed between Latin America and the US, for example. Technological activity in Silicon Valley that garners widespread public attention is dominated by updates to Facebook or Twitter, not new features or increased adaptation of the cloud space. Conversely, cloud technology in Latin America is receiving heightened exposure as governments are adopting such technologies, which paves the way for wider incorporation on the part of businesses. For example, in Colombia, the Instituto Colombiano para la Evaluación de la Educación (ICFES) partnered with Microsoft to develop a cloud-based software to efficiently distribute all of the scores from nationwide required exams

administered by the Ministry of Education.

Broad cloud adaptation on the part of the government has not occurred in the United States or Europe, for which the primary cause is what the European Commission's technology chief, Neelie Kroes, aptly referred to as the “jungle of standards.” In the US, strict security compliance required by the Sarbanes-Oxley act is the main issue; in Europe, most barriers to implementation similarly center around security regulations such as the Directive on Data Privacy, as well as tax issues and conflicting privacy laws between countries. Nonetheless, the two regions are trying to push for broader implementation because as Doug Bourgeois, Director of the National Business Center of the US Department of the Interior, stated, “Security is an issue we have to manage, but the scalability, affordability, flexibility and maturity of the cloud computing model make it all but inevitable.” In fact, there are a number of security features that have been developed to mitigate such concerns, which include contractual protection, security audits of service providers, third party security certification, and the development of security standards. Moreover, overcoming security concerns is an inevitable phase in the introduction of online technology; online payment, for example, is widely used and accepted, but was also received half-heartedly at first for similar security reasons.

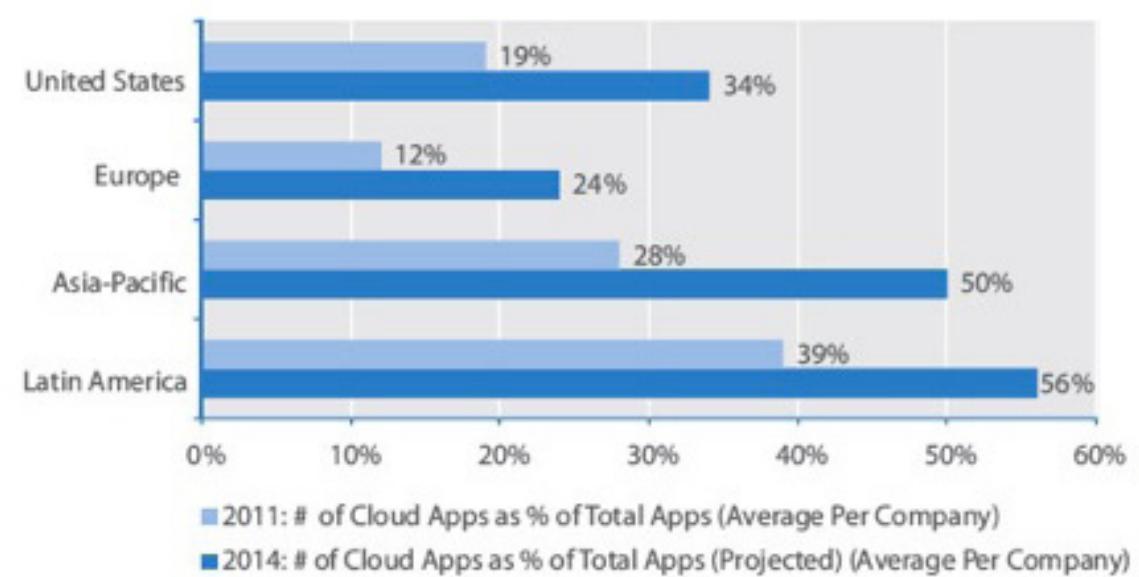
Europe has also been making a great push for broader cloud implementation in ways other than combating security concerns. Studies conducted by the European Commission, the executive arm of the EU, project that greater incorporation of cloud tech-



Finally, Europe will also try to spur investment in cloud computing technology, as currently it has mainly been only the German corporation SAP that has made any significant progress in the area of cloud computing.

Despite this planned progress in the US and Europe – and the tangible advancement in Latin America and Asia – whether or not corporations will reach the levels of implementation they aspire to as outlined in the previous figure is debatable. One issue, particularly in Europe and the US, is the notion that current systems in place are functioning properly, leaving little incentive to overhaul and change. Moreover, estimates for increases in usage are quite high; in Europe for example, the jump from 12% to 24% imple-

“ THE KEY CHARACTERISTIC CITED FOR THE USE OF THE CLOUD IS ITS POTENTIAL FOR ‘SPEED AND AGILITY.’ ”



nology would result in a \$1 trillion increase in the bloc's GDP and the creation of 3.8 trillion jobs. These staggering statistics will undoubtedly serve to boost interest in incorporating cloud technology. In addition, the European Commission is planning to set up a European Cloud Partnership (ECP) to encourage member states to store more public data in the cloud. To maintain user confidence and to take into account the aforementioned security concerns, under new guidelines, European users of cloud computing will be able to request that their data be stored in a specific region. In the case that users choose not to elect where they wish to have their data stored, the existing EU Data Protection Directive requires that it either be stored in the European Economic Area or in a territory that has equivalent privacy laws. Thus Europe is creating a framework that will first allow for more personal control over cloud data, but will additionally be able to operate in conjunction with the secure regulatory infrastructure already in place.

mentation would represent a 100% increase in usage. Whether each region will reach the lofty projected estimates remains to be seen. However, potential for huge increases in usage lies in the fact that cloud technology becomes more useful as the number of users increases. The emergence of a Cloud Value Chain is predicted, in which the delivery models will build off of each other; SaaS providers will come to use the services of PaaS providers, who will both collaborate with IaaS providers in lieu of investing in the costly project of developing their own internal infrastructure. Moreover, social cloud computing has also seen a rise as of late; companies have increasingly used cloud for online communities or internal social networking. Thus since the impact of cloud computing is amplified by higher levels of usage, there is a possibility for small increases to grow exponentially into large increases. There is no doubt that we can expect to witness an increase in cloud usage in the future. The question that remains is simply to what extent.

# Fashion in a Technological Age

BY DAVID HIRSCHY W'16

What do Steve Jobs and Giorgio Armani have in common? To start, they both are creators, generating concepts that have transformed how we live our lives. They are both, at their core, innovators. But perhaps more interestingly, their respective industries – technology and fashion – are starting to overlap in new and exciting ways, beginning a steady democratization of an industry that is historically inaccessible, opaque, and elitist. Just as technology has disrupted so many other industries, so it appears that technology's "Robin Hood" effect is poised to knock fashion off its high horse. From textiles to runway shows, from style journalism to the shopping experience itself, technology is upsetting the status quo of the fashion industry.

Cotton, wool, cashmere... and Storm Tech System? The former three are household fabric names, but what about the fourth? After scaling Aconcagua – the highest mountain in the Americas – Oskar

Metsavaht, a Brazilian sports medicine specialist and high adventure enthusiast, began contemplating the lack of accessible, specialized, athletic clothing in Brazil. In response to the problem, Metsavaht designed Storm Tech System, which is a permeable fabric that simultaneously is resistant to cold weather. It solves for extreme wintery climates while allowing sweat to still evaporate off the skin. With the foundation of his innovative fabric, Metsavaht established his clothing company Osklen. Since then, Metsavaht has expanded to a ready-to-wear line that fuses sportiness and urban futurism. In the grand scheme of fashion, Osklen is one of many companies established in the last three decades that are quickly becoming fashion industry paradigms.

First, practicality is marketable. The illusion still persists within some segments of Western culture that all luxury fashion is absurdly delicate to the point of being impractical to wear. If that ever was a reality of fashion, the advent of more advanced fabrics has changed that. Luxury and pragmatism are no longer mutually exclusive.

Second, fashion can and should be ecologically sustainable. In addition to his Storm Tech System, Metsavaht has successfully experimented with incorporating revolutionarily sustainable materials, from pupunha wood to fish skin discarded by the seafood industry. Looking good does

not have to equate to damaging the environment.

But beyond simply introducing new fabrics, technology can now endow textiles with new, desirable qualities. Ross Nanotechnology in Lancaster, Pennsylvania specializes in applying a post-production coating to fabrics that makes them extremely hydrophobic. The coating, which gives the fabric a surface angle between 160° to 175°, causes water molecules to more or less slide down the surface. The process has some obvious advantages by making textiles anti-spill and more wearable in inclement weather. Yet, technology is hardly limited to textiles alone.

In more traditional terms of technology, the intersection of digitalization with fashion is also changing the landscape of fashion shows and how collections are viewed. It's old news that anyone with a computer can now access these extravagant displays; however, the push for a new fashion show experience continues.

Diane von Fürstenberg, a Belgian-American fashion designer based in New York City, furthered that effort last September when she created a behind-the-scenes style video documenting the exhibition of her Spring/Summer 2013 collection. The film, which was recorded via Google Glass, was literally through the perspective of the designer and her team of stylists and models.

Google Glass, which is set to release to consumers in late 2013 or early 2014, intends to provide typical smartphone abilities condensed into a minimalistic pair of glasses. So as von Fürstenberg's models strutted down the New York runways, Google Glass recorded their view, which provided the footage for the video. This pilot effort is a clear example of how technology is providing novel outlets to experience fashion. The Internet allowed the whole world to see the fashion show; now, technology enables society to be involved in the show itself.

But if viewing runways virtually is possible, why isn't creating virtual runways also possible? Nicola Formichetti, the creative director of Parisian fashion house Mugler, asks the same question. In collaboration with Icelandic gaming company Crowd Control Productions, Formichetti is developing a digital catwalk that will unleash fashion design from the constraints of reality.



While this outlet is certainly unlikely to ever surpass the import of actual fashion design, it does present some interesting benefits. For example, changes can be made at the click of a mouse or the stroke of a key. The design process is generally much more efficient in that time is saved when one would otherwise have been cutting fabric and fitting the outfit, which gives the designer more time to spend in the creative process, which is arguably the most important stage of production.

Since this technology has yet to fully launch, it is unclear exactly how it will affect the fashion industry, but there are some distinct possibilities. One likely development is that the virtual runway will establish an interchange of ideas between digital and material worlds. An idea so bizarre that it is first developed on a digital platform could later inspire real experimentation that leads to the pioneering of new trends in tangible shows. Another, even more likely, possibility is establishing this as a public platform. Young designers who have not yet acquired the capital to design physical creations can test the waters of fashion and perhaps even build a virtual portfolio of ensembles, decreasing the barriers to entry in this industry. As a result, fashion may become even more competitive as the number of aspiring industry members increases.

Just as first-hand experiences with fashion change, the second-hand experiences, primarily style journalism, also evolve. One of the most apparent developments has been the proliferation of fashion blogs. Today, anyone can take on the role of critic, which provides instant and myriad feedback to designers. Although some of these are undoubtedly lowbrow contributions to the continuous fashion discussion, the blog explosion has made that on-going conversation more dynamic and diverse than ever before.

However, fashion journalism's crossing with technology extends far beyond the blogosphere. The Wall Street Journal premiered an innovative application of digital social media to journalism during New York Fashion Week in September. Photos captured from the catwalks were filtered and uploaded to the newspaper's Instagram feed. The effort of course taps into the vintage photo network's burgeoning popularity, but it also reflects the importance of niche social networks. The filter process of Instagram enhances the artistic quality of the already fanciful couture in a way that simply uploading the photos to Facebook or Twitter would not have. The strategy was also thought-provoking in that it proves the lack of neutrality within the media. At their core, Instagram's fantastic filters distort reality – changing hues and brightness. What followers of

The Wall Street Journal's Instagram saw was decidedly different from the actual collection looks. This raises an important question about the purpose of fashion media: to what extent is a reflection of reality the goal of style journalism? The answer undoubtedly lies in future attempts to report fashion news through the lens of Instagram and whatever other warping social media develop in the coming years.

Finally, and perhaps most importantly, technology is altering the shopping experience itself. Most of the Western world is familiar with the concept of online shopping, but the integration of social media with the shopping experience as of late has once again changed the game. Fab.com, which was launched by CEO Jason Goldberg and CDO (Chief Design Officer) Bradford Shellhammer, connects the scrolling, gallery-esque view of Pinterest with online shopping. Products adhere to the concept of "everyday design" but range from clothing to office supplies to furniture. Members can tag inspirational pieces to their account and share almost the entirety of their Fab.com experience with their Facebook friends and Twitter followers.

Over the next few years, commerce is liable to become increasingly socialized. As new social networks are developed and existing ones are furthered, the result is going to be more interactive purchasing. Friends will have greater opportunity to comment on the style choices of their peers, which could initiate one of two consequences. There could be a flattening of style, meaning that the influence of seeing a Facebook friend's purchase results in one mimicking the selection, resulting in a more stylistically uniform culture. Alternatively, social commerce might actually have a polarizing effect on fashion opinion, just as social media has encouraged some thoughtless battling over other issues, creating subcultural echo chambers on style discussion.

While much of the significance of the juncture between fashion and technology is still uncertain, four trends are identifiable insofar. First is the matter of accessibility in a number of sectors: to clothes themselves, to industry opportunities, and to information on the mechanics of the industry. Second, this democratization has and will continue to increase the competitiveness of fashion. Online markets have driven down prices and are likely to continue to do so. Third, fashion is becoming more interactive. Consumers across the globe have a radically larger number of opportunities to interact with the industry itself and with fellow consumers. Finally, this crossroad signals a push for higher quality in fashion, both in terms of materials and the aesthetic appeal.





**INTERVIEW:** Katharine Sarafian, Producer at Pixar

**“ STEVE [JOBS] SAID, ‘MAKE IT GREAT. BUT DON’T JUST MAKE IT GREAT...MAKE INSANELY GREAT.’”**

# The Brain Trust Behind Woody, Nemo, and Merida: A Look Inside Pixar with Producer Katherine Sarafian

INTERVIEWED BY **LAUREN ZAKARIAN-COGSWELL** W&C'15

In less than twenty years, Pixar Animation Studios, along with the iconic image of its playful mascot Luxo the lamp, has become a household name symbolizing the vast advances in computer-animated films in the entertainment industry. Since the smashing success of Toy Story in 1995, Pixar has captivated world audiences of all ages with its enthralling storylines, relatable characters, and thrilling, lifelike animation technology. IBR sat down with Katherine Sarafian, producer of Pixar's latest film, Brave, at their Emeryville, CA headquarters to discuss the latest animation technologies as well as Pixar's marketing philosophy, its relationship with Disney, and the studio's development and identity throughout the last two decades.

**I**nternational Business Review: What led you to pursue a career in animation and at Pixar in particular?

Katherine Sarafian: At UCLA film school where I was in the graduate program, we had a lot of great guest speakers. One of the guest speakers was actually from Pixar and they came in and showed a couple of short films. I was already focusing my masters program on new directions in digital arts and computer technology for filmmaking, so I knew that there were things you could do with technology and art, but I wasn't sure what. After I saw the Pixar presentation, I could see the link, that you can actually tell stories and not just make computer music but also make computer pictures. I was really intrigued by that, so I sent in my resume right away, even before I finished my masters degree. I personally have always had a left-brain, right-brain split; I have a heavy logic and math side and a heavy art side. In school and when you're going to career counselors, they always try to track you and make plans for you by asking "Are you artsy? Are you science-y? What are you?" This place is full of people who are both. Producing requires number-crunching, science, math, art, all these things.

**IBR:** How did the atmosphere and dynamic at Pixar differ from those of your prior working experiences? What is it about Pixar as a company that has kept you involved for the majority of your career?

KS: Obviously, this is a very creative environment and the whole building is structured for creative collaboration. When I first started at Pixar, I was coming from Hollywood internships where everything was a little bit more secretive within the office, like closed-door meetings and that kind of environment. Then when I came to Pixar - we were not at this facility yet, we were in Point Richmond – so while it was a rented office park, it didn't look particularly interesting. Everything was very open, and even though we're very good at keeping secrets from the outside world, like we don't talk about the projects in development, we're quite open within the building and we share our work. If you walk into this building now, that we moved into in 2000, the conference rooms are all glass-walled and you can look across from room to room and see who's meeting with whom. It's a very open and visible environment where there are constant reminders of what

we're doing as filmmakers through the art on every wall.

**IBR:** Do you find that Pixar benefits from the fact that its headquarters are in the San Francisco Bay Area, it being a hub for technology and innovation?

KS: Definitely. Not only can we bring in great engineering talent from Silicon Valley, but also, the Bay Area is the birthplace of computer innovation and it has a wonderful animation history, even in stop motion. You have people, like the George Lucas team up in Marin, who want to work in this northern environment that is quieter and away from the Hollywood hubbub, where you can really gestate a project. We work on these films for years so we want to be in an environment that's a little bit cloistered and separate from LA. I did the LA thing for six years and I liked it. But animation is filmmaking in slow motion, where you're really chipping away at it very slowly. This place suits the pace of what we do.

**IBR:** You joined Pixar during the development of its first computer-animated feature film, Toy Story. Through your perspective and personal experience, how has the company developed and morphed since 1994 into its current position as a household name? What are the most significant changes that you have witnessed?

KS: There was a certain amount of naïveté when I started in

“ WHAT'S INTERESTING ABOUT PIXAR'S DEVELOPMENT THROUGHOUT THE YEARS IS LESS ABOUT WHAT HAS CHANGED AND MORE ABOUT WHAT HAS STAYED THE SAME. ”

1994 on my part and I think on the company's. We were working on Toy Story – we had a one-picture deal with Disney for them to help us finance and distribute this film – and we kind of didn't know what we were doing. We learned as we went. There was no assumption at all that this film would be successful and when it was, it blew us away. But it was funny: Toy Story's success didn't change us. Steve Jobs, Ed Catmull, and John Lasseter built a deal with Disney to make five more new pictures and did success change us at that point? No, because each story still had all the same rigors and growing pains – telling a really great story always was and is still really hard to do. Every one of our films hit some sort of creative crisis point along the way and that's been the constant. What's interesting about Pixar's development throughout the years is less about what has changed and more about what has stayed the same. Just up to Brave, where we had a huge story crisis and we actually had a director change and we went through all these creative issues to get to the final film. WALL-E, Ratatouille, they also had a director change. And that's how Toy Story began.

When I first applied for a job, they called and said they weren't hiring. And I later found out when I was hired that the story wasn't working and they had shut down due to creative issues. So they had to then work on the story and rehire. So that's the same thing that we've been doing for years. I'd say one thing that has obviously developed besides our great new campus which is a wonderful environment for making the films, is John Lasseter, who directed Toy Story, A Bug's Life, and Toy Story 2, is not the director of all the movies anymore. He began to instead mentor other directors. Pete Docter and Andrew Stanton, who were both hired early on by John during Toy Story, have now directed their own films. Lee Unkrich, Mark [Andrews], Brenda [Chapman] and all the other directors have been brought up through the ranks, so there has been a lot of mentoring through the years.

**IBR:** Can you guide me through the process that Brave underwent since the idea was formed? Are there any aspects of this timeline that are formulaic, or do they vary from film to film?

KS: While there is no formula for the Pixar movie, the timeline all are roughly four to six years. I think our shortest production process period in calendar time is about four years and our longest is more like seven. Brave was on the longer end of the spectrum at about seven years. I came on in late 2006 and spearheaded the research trip to Scotland. The nugget of the idea of a mother-daughter story had originated even earlier in 2004 when

which is John Lasseter, Andrew Stanton, the brain trust saying "That's good to go" or "That needs to be re-worked." Anything that's good to go, we move in and animate. In live action, you shoot your footage and edit it. In animation, you edit before you shoot. We actually edit everything as storyboards so we don't animate anything we don't need, because animation is time-consuming and expensive. We make sure we set something in stone the best we can and everything from there in animation becomes adding onto and improving upon it rather than cutting it out.

**IBR:** Have you noticed any differences in the way Pixar films have been received by foreign audiences? Do you have to market the films a certain way in the U.S. and a different way in Asia, for example?

KS: The simple element of marketing for our movies is because they are very story-driven; it's all about the story rather than a technology gimmick or character gimmick. We have a good track record of telling stories that have universal appeal using a certain combination of heart, humor, relatability, and adventure. What I've learned through the marketing of Brave is that one of the very important things is our partnership with Disney Character Voices International (DCVI) and they have a phenomenal team of people who select and direct the dubbing talent. The best marketing tool is not really to market the film, it's to show it, and to show it in the native language. Rather than subtitling the film,



we actually dub it with terrific comic actors from those regions in that language. The group right behind you is the Korean press, and they saw Brave last night in Korean. Their voice talent Ms. Kang [Sora] is here and she stars as Merida in South Korea. So even though it's set in Scotland, audiences all over the world can relate to it in their own way. Even the songs are dubbed. Also, we actually go to those territories when the film is released. Mark and I were gone for all of June – we would visit, show the film, and share our experiences with the local teams there. I would say the last and one of the most important elements is the relatability of character. At the end of the day, you don't need a marketing angle if, like in Brave's case, it's a parent-child story, which is universal. People would ask "So, what's the movie about?" And we would respond that it's an action/adventure film, but at its core, it's a family story. And everybody has that kind of relationship that they've experienced. You're either the parent of a teenager now, you are a teenager, or you remember being one. I remember the Russian voice talent manager saying to me "It's such a quintessen-

## KATHERINE SARAFIAN



Katherine Sarafian has been an integral part of the success and growth of Pixar Animation Studios, holding a variety of key leadership positions that have culminated in her role as producer on Pixar's most recently released feature film *Brave*.

Sarafian joined Pixar in 1994 as a production coordinator on the studio's first full-length feature film, *Toy Story*. From there, she continued to develop her film production experience as production manager in Pixar's short film department, and as art department manager on the studio's second feature film, *A Bug's Life*.

After completing her work on *A Bug's Life*, Sarafian shifted gears and moved on to positions in the creative services and consumer products departments. She eventually became director of marketing for the studio.

In 2000, Sarafian transitioned back into production at Pixar, first as production supervisor on *Monsters, Inc.* and then as production manager on the Academy Award®-winning feature *The Incredibles*. She next took on the role of producer for the Academy Award®-nominated short film *Lifted*, which screened in theaters worldwide with Oscar®-winner *Ratatouille* in 2007.

Prior to Pixar, Sarafian worked in development at Castle Rock Entertainment and in digital entertainment at Sanctuary Woods Multimedia.

Sarafian holds a Master of Arts degree in Film and Television Critical Studies and a Bachelor of Arts degree in Communication Studies, both from the University of California, Los Angeles. She has taught undergraduate film and television courses and has represented Pixar at a variety of film festivals throughout Japan, Europe and the United States. A native of Oakland, California, Sarafian is active in the San Francisco Bay Area theater, music and arts communities.



"[If] you see a Pixar ad on a bus or a billboard somewhere, it reflects the movie we're making rather than a focus group approach to marketing. That was the idea and that is what we have tried to do: the movie drives everything."

tially Russian story!" That's the kind of reaction we see.

**IBR:** In developing a Pixar film, what is the balance between storyline and visual effects? Is there ever any concern about one component outshining or overtaking the other?

**KS:** That's actually an easy one. The story is the beginning and end of everything at Pixar, so as a creatively driven studio, everything we do is based on what the story requires. So Merida's hair – and everybody has written about the "technological marvel" that it is – wouldn't be there purely for technical reasons. Her character was developed from the very early stage as headstrong, fiery, and like no one in her family or environment. She's this untamed, wild spirit and a child of the outdoors and that meant not just wild, curly hair, but red that popped against that Scottish background. So that was, from the very first idea of

that, that was, from the very first idea of this character, who she had to be. A short, straight haircut just would not work for her. We tried a lot of things to get her hair to work and at one point we actually contemplated whether we would have to get a haircut. If we had given her a haircut, we would have been able to render it more easily, but that would not be her character and the story won't work. Every decision, even the layer of garments that the characters wear are grounded in the story. The cold Scottish climate calls for layers and kilts. The vegetation in the forests was very complex to execute as well. Our thinking is that we will never over-take or compete with the

story if something is done because the story requires it. If you do something the story doesn't require just because it looks cool, then you're in the danger zone. Everything is story-driven. And that is actually how we manage our budget too. If I wanted to base everything on how good it looks, it would also be hideously expensive. If Mark says "Hey, I need flying shrapnel when Mor'du puts his paw down", I'm able to ask "Mark, why do we need the shrapnel?" He can reply by saying that it looks cool, in which case we don't need it. But if he says "Because you've got to feel the force of Mor'du right now and without that shrapnel, you won't see the destruction and havoc he can wreak. Merida's right there and she needs to be in peril." That is a story point and everyone can understand that.

**IBR:** Besides producing, you have worked in the art department (for *A Bug's Life* in 1998) and in marketing (for *Toy Story 2* in 1999). Did you join the company knowing that producing the films was your ultimate goal, or did these varying roles in your early career guide you to your current position?

**KS:** The answer is "yes" to everything. As I once recalled it, I had joined the company knowing wanted to work in production but not sure in what role. I started as an assistant, became a coordinator, and moved up the ranks to manager, then production supervisor of Monsters [Inc.], then detoured to marketing, culminating in production manager of *The Incredibles* before pro-

ducing my first short. That to me felt like moving up through the ranks and it was all people management – and I'm a manager, I like being in that role of overseeing and managing people – so I did not necessarily grasp that it was producing until partway through. That said, I was cleaning my house the other day and I found a stack of e-mails from my previous job was at a video game startup in San Mateo. One of them was an informational interview of one of the producers, where I had asked questions like "I think I might want to be a producer, what do you think about...?" and so on. He gave me all this advice and I wrote him a thank-you note, which was all right there, so I remembered that I did want to be a producer and was asking about it. I think I didn't know what it truly entailed until I got here. So the answer is that it all just came together. I forgot I wanted to be a producer because here, you're so focused on what you're doing and the fact that you're making a cartoon with this amazing group of people, and a few years later I realized, "Oh, THAT'S producing." It was so much of a continual process rather than a step-by-step one that I forgot.

**IBR:** I see that as a good thing – you were so involved in your work that it was a largely holistic, seamless process.

**“ YOU HAVE TO...CHECK YOUR EGO. YOU'RE CONSTANTLY EXPOSED AND YOU'RE CONSTANTLY VULNERABLE. IF YOU HAVE AN EGO AND CANNOT TAKE THE CRITICISM, YOU WILL NOT MAKE IT. ”**

**KS:** Right, and it also meant that I, and this goes for me fellow producers as well, never had to ask "I'd like to produce a movie. Can I produce one?" No, we wait until we're asked. We're not driven toward our goal in that way. If you're here to produce and you only want to be a producer, then you are not part of the team. That's not the Pixar spirit. The Pixar spirit is that we do whatever we need to do. It's a very collaborative environment.

**IBR:** That also reverts back to the topic of the Bay Area/tech culture. When was interning at an Internet startup in San Francisco for the summer, it didn't matter what each individual's job description said. If you have to help with shipping boxes, you have to do it because at the end of the day, those tedious tasks have to be completed no matter what.

**KS:** Yes, exactly. Anyone here will drop the FedEx or do whatever needs to be done. You have to – and I think this is also a Bay Area thing - check your ego. You would think that the directors would be the most egotistical people in the world, but no. They have to spew this messy, creative process, show it to their col-

leagues, and tear it apart. You're constantly exposed and you're constantly vulnerable. If you have an ego and cannot take the criticism, you will not make it.

**IBR:** Can you describe the main technologies that Pixar uses that sets itself apart from other computer animation films? (ie. PhotoRealistic RenderMan) How does Pixar work to continually develop and improve these tools?

**KS:** RenderMan is always being developed and improved and is the industry standard. What's interesting about Pixar however, is that the majority of our filmmaking software is proprietary; we don't use a lot of off-the-shelf, outside software. We create our own. I think our dirty little secret throughout the years, or maybe people knew this, is that while we were pushing the envelope with technology and storytelling in a great way, our actual animation system that we built here was a bit antiquated. Not until *Brave* was it blown up and restarted. We developed a whole new suite of tools alongside the making of *Brave*, which is the first film to use them. It's called Presto. For years, we didn't use the most elegant user interface or the most resilient. Making Presto has been an effort to get our software into the new century. So the answer is yes, we have innovated and stayed ahead of the

curve in some ways and in other ways, we are actually just now getting our software to where it needs to be.

**IBR:** Can you comment on the evolution of animation in general, from the traditional 2D animation, like the Disney classics we grew up with, to computer-generated and 3D animation? Where do you see the industry heading in the future?

**KS:** It's my hope and belief that all kinds of animation will continue to thrive. I thought it was a shame when the 2D animation division of Disney closed down for a while and I'm glad they started it up again with *The Princess and the Frog*. I thought *Winnie the Pooh* was terrific and there's more 2D coming from there. Stop motion is still going strong and there's CG. From my perspective, and I think most Pixar folks share this belief, that animation is animation and CG is just one tool for making it. You can do CG, flip books, hand-drawn, ink and paint, and so on. There are zillions of ways to tell a story. While a lot of studios get on the CG bandwagon thinking that that's what everyone wants to see, 2D and stop motion: none of these are dead. With

a great story at the helm, you can go see any of these movies, it really does not matter how they're made. I hope that the future is about all kinds of animation and that if advances in technology continue, those will be speeding up the traditional 2D and stop motion processes. You can improve upon your process in a lot of ways through technology. But at the end of the day, even it's still frame-by-frame, one at a time. Even with all these computers, it's still making a movie in slow motion. So I think it's more about the story and less about the tool.

**IBR:** When so many diverse roles are incorporated into a single company, the resulting interdisciplinary dynamic must be fascinating. How do the various departments such as finance, marketing, product management, animation, and technical direction collaborate and interact?

**KS:** They are all housed in this building and we work together on an interdepartmental basis. The Pixar difference as I've experienced it, is because of our training program that we call Pixar University (PU). It has made arts training, science training, and all the kinds of training that you might want as any kind of employee here accessible. Our philosophy is that you are not an accountant who works at a film studio, you are a filmmaker who is an accountant. And you're not a receptionist working at a film studio, you're a filmmaker who answers the phones. You have

**“ WE ALWAYS ASSUME WE’VE GOT IT WRONG AND WE ALWAYS, ALWAYS TRY TO IMPROVE UPON IT UNTIL THE LAST SECOND. ”**

access to all the classes in screenwriting and sculpting; they're all here and they're all free. You have access to a fundamental film school education no matter what you do. Interdepartmentally we may work together as different departments but all approaching it with one goal: the movie. That's one of the reasons explaining why we list so many people in our credits, not just those who made the images on the screen. We believe it took everyone to make this movie.

**IBR:** Throughout your career, how have you gauged the nature of the progressions in Pixar's relationship and dynamic with Walt Disney, particularly after Pixar's IPO in 1995 and after the acquisition in 2006?

**KS:** It definitely has evolved through the years. We have had many leadership changes at Disney, the most significant being from Michael Eisner to Bob Iger. But mainly, I think as Pixar got its footing on how to do this, we have less and less handholding from our partners. They're always there if we need them, but

in the early days of Toy Story, our Disney friends would come up often and actually sit in the room and work with us. We were constantly on video conference with them to Burbank every couple of days, checking footage and numbers; there was a lot more oversight. Then in the new five-picture deal, they knew that we needed less help so they focused on their own animation while we focused on ours. Now there is actually a significant wall up between the two studios. We operate under the Pixar masthead as a separately operated company. It's a fairly hands-off relationship. Another change is that both Disney and Pixar animation studios are now overseen by Ed Catmull and John Lasseter, so it's an odd reporting relationship. That means that when the Disney bosses come quarterly, they are looking at both Disney animation and Pixar animation.

**IBR:** Can you describe the nature of Steve Jobs' role at Pixar and the legacy he left on the company?

**KS:** Steve was, first of all, extremely instrumental in this building. He worked very closely with the architects to help design it: this central atrium was his vision. His plan for unplanned collaboration was that everyone has to meet in the middle; he wanted us to be working at the most creative place in the world. He used to come in three days a week, then he started coming in two days a week, then one day a week and so on, as again, similar to Dis-



Film Still from Pixar's *Brave*

ney, we needed less oversight over time and he became more busy with Apple through the years. His legacy is the same as his initial mission statement, which is what he said to John Lasseter when he bought the company and John asked him, "What do you want me to do?" and Steve said, "Make it great. But don't just make it great... make it insanely great." So we're constantly thinking to make everything we do "insanely great." I hear it in my ears all the time, even if I see a poster and think "Well, that's good, but it could be better." It's like I have a little Steve on my shoulder and having worked with him directly in the marketing years, I had a front row seat and a great education on that philosophy: "Don't settle. Make it great."

**IBR:** Can you elaborate on that marketing role for Toy Story 2? How did the varying spheres of business, innovation, and entertainment come into play?

**KS:** The reason I went into marketing in the first place was I was pulled over from *A Bug's Life* where I was in production as

an art manager into a team of marketers by profession, and that was the whole idea: make a filmmaker a marketer rather than bringing in more marketers. This was meant to put more of the filmmaking aesthetic into the marketing materials, so that if you see a Pixar ad on a bus or a billboard somewhere, it reflects the movie we're making rather than a focus group approach to marketing. That was the idea and that is what we have tried to do: the movie drives everything. The movie's presence in the world should be relatable right back to the movie rather than a consumer psychology-based campaign.

**IBR:** Having lived through and played a key role in most of Pixar's company history, what do you see in its future?

**KS:** The beauty of our directing pool here is we have lots of great ideas from lots of great directors. What I appreciate is that we are continuing to not rush the projects. It's slow going – we still put out about a film a year – every one of them is really hard

to make, and no film must have the easy route, which means no film is coasting. We always assume we've got it wrong and we always, always try to improve upon it until the last second. I have huge faith in that part of our process and that in turn gives me faith that our films will be of a high quality for years to come.

**IBR:** Can you tell me about any exciting projects you're working on? *Finding Nemo 2* rumors?

**KS:** Hah, many rumors! Well *Finding Nemo* in 3D is coming out next month, which is really beautiful. I've seen that and I couldn't believe how gorgeous it was – it's such a great story and I'd forgotten it since I hadn't seen it in such a long time. *Monsters University* in 2013, we have *Good Dinosaur* in 2014, we have an untitled movie that takes you inside the human mind coming off of that, we're working on a *Dia de los Muertos* movie from the director of *Toy Story 3*, and... a bunch of other stuff I can't talk about.

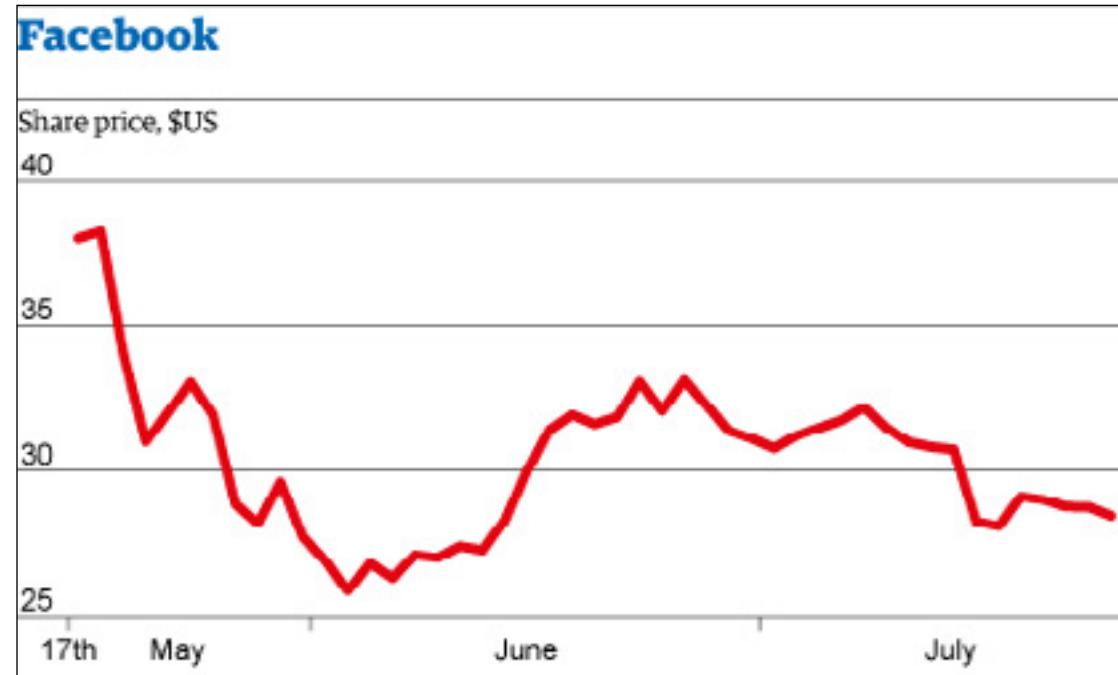
# A Social Networking Giant Continuing to Fall Short

BY ARA GARIBYAN W'15

With social networking swiftly achieving an indispensable presence in modern culture, Facebook is further catalyzing the process of globalization through the Internet that has been taking place in the last two decades. When Facebook filed for its initial public offering in May 2012, its immense amount of growth and popularity lent it one of the most highly anticipated offerings in history - at \$86 billion, it was dubbed the most valuable IPO of all time. However, contrary to its expected value and success, Facebook's social features and financial structuring have given rise to numerous drawbacks and conflicts that the company has had to address. As of October 5, 2012, its stock price has seen a dismal 45% drop from its IPO price. Investors are attributing this decline to Facebook's inefficiency in determining a sustainable monetization strategy regarding its advertising potential. Facebook generates targeted

detrimental to its success as a publicly traded company.

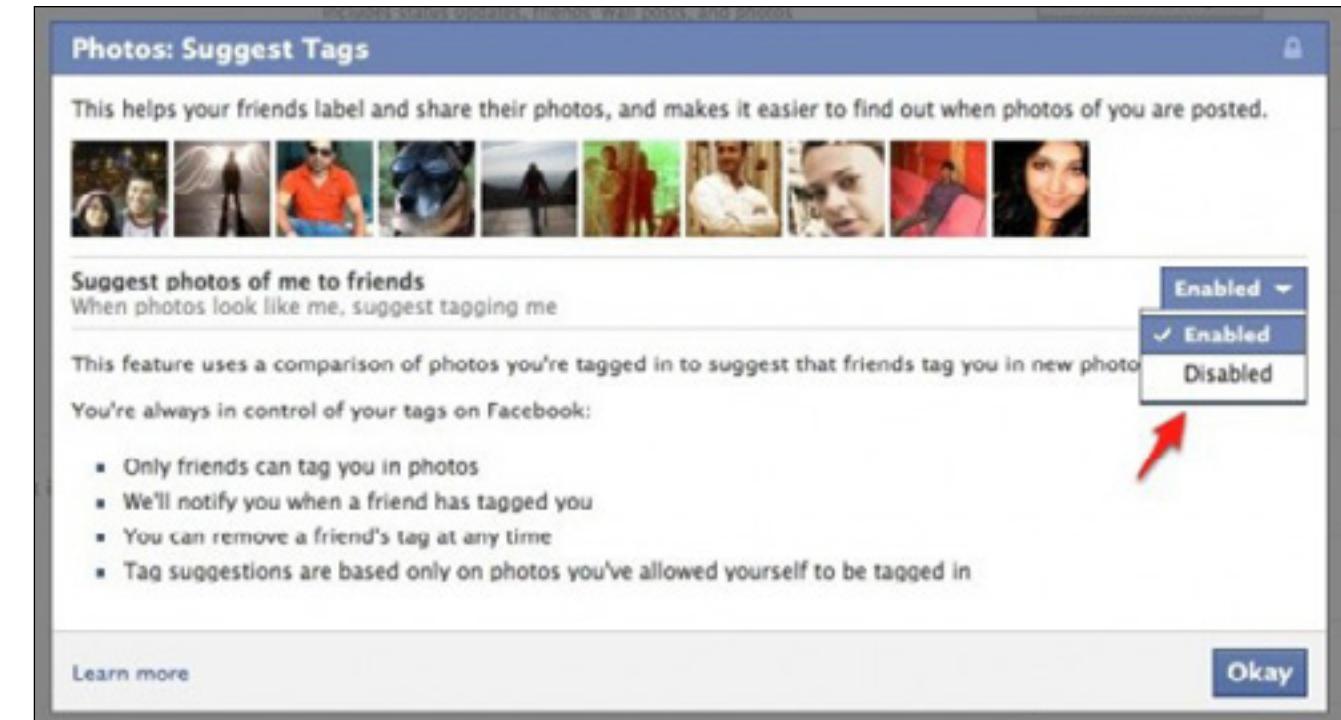
In particular, policies regarding the disclosure of data collection methods consistently pose problems for Facebook, especially in Europe where privacy laws are considerably stricter than those in the United States. An increasing number of European governments are demanding that Facebook make more of the data it has collected from each user available upon request in a data archive; even upon the release of this data, officials have maintained this stream of demands from the company. In summer of 2012, when Facebook increased the amount of data available for disclosure, over 40,000 European users requested a full copy of their individual data, which, according to European law, must be delivered within 40 days. Furthermore, although Facebook has agreed to disclose more information, they only offer disclosure of 39 out of 84 data categories.



advertisements based on its collection of personalized data from user activity on the website, which has sparked considerable international controversy relating to user privacy rights. Because Facebook derives much of its profits from the targeted advertisements and other personalized features, the growing uproar related to the legality of these methods is preventing Facebook from successfully expanding internationally. Therefore, unless Facebook can reach a form of privacy policy compromise in the European markets in which it has been attempting to expand, its stagnant international growth will prove

company's revenue. The sharing of this information may therefore not be favorable to the company financially, but its public image, especially because it is a relatively new and growing venture, is an issue that requires serious and immediate attention. Nevertheless, such compromises are an inevitable possibility in the near future and are something to be left to Facebook and foreign governments to discuss and enact.

Moreover, a number of Facebook's more recently developed features are creating controversy in Europe and give further rise to



Facebook's Controversial Facial Recognition Feature

questions regarding the security of one's personal privacy on the site. Most notably, the automatic facial recognition feature, which identifies friends in one's photos and presents their names as possible tags, has been the center of considerable controversy to the point that Facebook has decided to remove it altogether. This new feature caused the most uproar in Germany, where officials demanded that Facebook require individual user consent to "harvest biometric

Facebook implement a method that can correctly verify a person's age before allowing them to open an account. The lawsuit thereby furthered Facebook's privacy battle by introducing the balance between parental control and company oversight.

Because Facebook is now publicly traded, it must more readily take into account the public's issues and concerns regarding personal privacy. With its expansion to international markets, these

**“CONTRARY TO ITS EXPECTED VALUE AND SUCCESS... ITS STOCK PRICE HAS SEEN A DISMAL 45% DROP FROM ITS IPO PRICE.”**

problems are prone to arise. For example, even outside of Europe, there are censorship problems in China that Facebook will have to overcome. During the Xinjiang Independence Movements of 2009, the Chinese government began to censor Facebook because the activists of the uprisings were using the site as a platform for a vast communication network. Therefore, it is clear that Facebook has a vast array of problems related to disclosure, or lack thereof, of information. Even though the data collection methods are meant for advertising use, which creates revenue for the company, these methods are ironically causing more fundamental problems for Facebook

that they must assess and resolve. These issues regarding the access and release of personal information, compliance with the privacy laws of Europe, and other related ethical issues are testing Facebook's ability to compromise with its users within the European and broader international markets in order to develop and maintain a positive reputation sustainable for future growth and success as a publicly-traded company.



# Scandinavian Success

BY SHANA MANSBACH C'14

As continental Europe teeters on the brink of financial collapse, its leaders would do well to look north. The Nordic countries, consisting of Norway, Sweden, Finland, and Denmark, stand out as the heroes of the financial recovery, rebounding from an initial downtown with booming productivity and high employment. Banks are flush with cash and are lending, the housing market is vibrant, and budgets are balanced. Amidst the sclerotic growth and unpredictable market activity of the rest of the developed world, a closer look at this Scandinavian success is merited.

While generally lumped together for their shared association with Vikings, neutrality, and fair-haired denizens, each nation enjoys a distinctive history. Denmark and Sweden waged war as two of the great powers of the 17th and 18th centuries, while Norway and Finland existed largely under the thumbs of the latter two for much of their history and achieved independence only in the twentieth century. As a result, the political structures of the nations diverge: three of the nations are constitutional monarchies, with Finland standing as the sole parliamentary republic. To complicate matters further, Norway stands as the last Nordic holdout against joining the European Union, while Sweden and Denmark have joined but kept their own currencies.

In the structures of their economies, however, the four nations enjoy enough similarity to make it possible to speak of a "Nordic model". This model is characterized by a high-tax, high-social expenditure scheme highly distinct from the designs of both continental Europe and America. Although the region arouses horror from some conservative camps for its cradle-to-grave welfare system, Scandinavia can only marginally be deemed socialist; key industries are deregulated, universal school vouchers have been established, and levels of social outlays are comparable to those in continental Europe. And unlike the American welfare system, the Nordic model

does not seek to take from the rich and give to the poor, but rather gives individuals back the majority of the taxes they pay throughout their life cycle, a luxury afforded to them due to their uncommonly low unemployment and income inequality rates. According to Lund University economist Andreas Bergh, as quoted in the National Review, "if you pay more when you work, you will also get more when retire."

Disproving claims that a large state enervates the economy, the Nordic model has proved wildly successful. The Nordic countries lead the world in an array of economic measures, routinely topping the charts of the World Economic Forum's Global Competitiveness Report. All four nations outpaced their continental neighbors in each of the twelve "pillars" of economic success, which include infrastructure, macroeconomic environment, and health and primary education.

The prosperity of the region is in large part due to vibrant capitalist institutions and a competitive private sector. According to a study by Mercedes Delgado at Temple University, Christian Ketels and Michael E. Porter at Harvard and Scott Stern at MIT, the Nordic countries earned the highest grades of any country in worker productivity, cost of business, and monetary policy. The World Economic Forum's report corroborates these findings, ranking the Nordic countries as having better business sophistication, technological readiness, and higher education and training than both the United States and continental Europe. Additionally, according to the 2010 Index of Economic Freedom, the Nordic countries offer greater business, monetary, financial, trade, and investment freedom than nearly every other nation.

Much of Scandinavia's success can be attributed to its swift and decisive handling of past economic crises. Severe recessions sunk the economies of all four nations in the 1980s and 1990s, forcing

them to fundamentally restructure their economies. While each nation faced a unique crisis situation, all had to tackle high inflation, high unemployment, and weak currencies. Economic policy was modernized and market reforms embraced, with deregulation and lower taxes leading the recovery. Sweden and Finland in particular instituted major reform packages, instituting entirely new macroeconomic frameworks embracing the IT and telecom sectors. When the recent financial crisis struck, the Nordic economies were able to shrug off the brunt of the economic blow due to these structural reforms.

In light of such performances, calls within continental Europe

represents the secret sauce to growth in Scandinavia, and an embrace of social democratic policies in other nations is unlikely to replicate the region's economic performance.

In recent years, however, threats to Nordic economic success have arisen. Influxes of immigrants present the largest threat to the system. Immigrants in Scandinavia are in large part refugees and asylum seekers, who struggle to find work and assimilate into society. Sweden, for example, takes 100,000 of these immigrants under its wing every year, a statistic that is beginning to rattle its native-born population. Differences in employment rates between

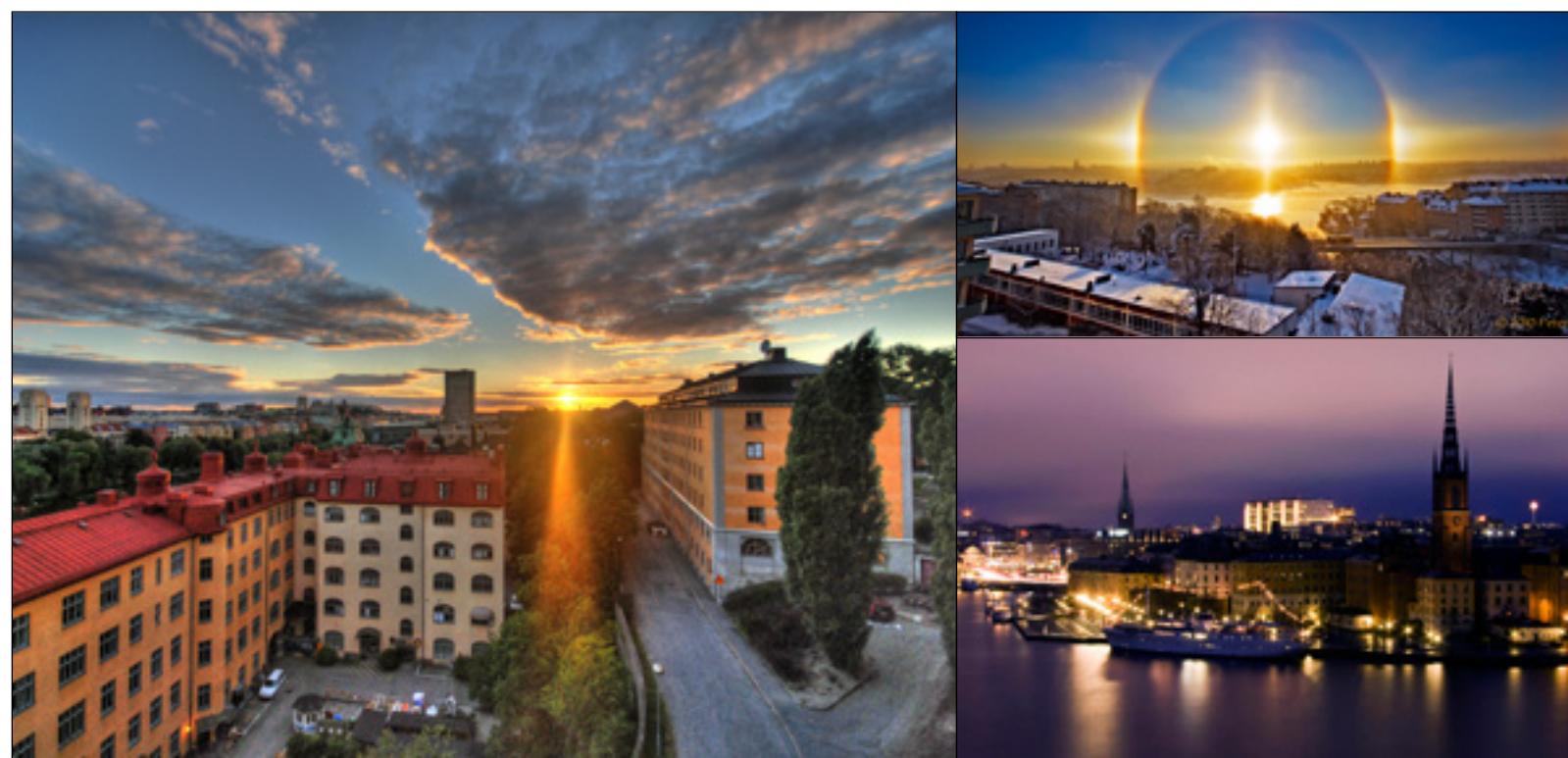
**" THE REGION'S MATCHING OF HIGH SPENDING WITH HIGH TAXES AS WELL AS ITS ARDENT EMBRACE OF CAPITALIST INSTITUTIONS HAVE HELPED SOLIDIFY ITS POSITION AS A TOP ECONOMIC PERFORMER. "**

for a move towards the Nordic model have sounded. A Nordic panacea is unlikely, however, as the success of Scandinavia's high-tax, high-social spending model is rooted in cultural and demographic factors, specifically its remarkable ethnic homogeneity. In all four nations, nearly 90% of the population is of Scandinavian stock (although Sweden no longer collects data on the ethnicity of its citizens). This homogeneity creates a sense of "we're all in this together" that makes high taxes palatable. Comparable levels of homogeneity are unheard of in America and most of continental Europe.

This ethnic and cultural homogeneity leads to the world's highest levels of social trust, which enable low transaction costs. In nations in which nearly 80% of citizens report that "most people can be trusted", the inefficiencies and costs of excessive lawsuits, written contracts, and legal paperwork are avoided. This social cohesion

native- and foreign-born Swedes are as high as 30% in some regions; in one immigrant-dominated suburb, Rosengård, the unemployment rate towers at over 80%. Native Swedes' distaste for buying into a social welfare system that entitles a non-working population to a lifetime's worth of benefits throws the Nordic model's sustainability into jeopardy.

Nevertheless, continental Europe would benefit from taking a page from the Nordic playbook. The region's matching of high spending with high taxes as well as its ardent embrace of capitalist institutions have helped solidify its position as a top economic performer. Such lessons may be little comfort to a keeling European Union, but coming from the region that the Wall Street Journal has praised as "the biggest success story in post-recession Europe", they should not be discounted.



# Deepwater Drilling: Interest, Investment, and Intrigue

BY RAM NARAYAN C'13

Beneath the ocean floor lie resources that can continue to propel the global growth engine to new heights. With oil prices at historic highs, many new methods of hydrocarbon extraction have become feasible for the first time. Deepwater drilling and its related technologies have gained especial traction, bringing interest, investment, and intrigue to the sector around the world.

Exploration and Production magazine termed Brazil, the Gulf of Mexico, and the West African coast together the “golden triangle” of deepwater drilling. Surging oil prices and advances in drilling technology have helped these areas buttress their position as leaders in this sector. The discovery of Tupi Field, off the coast of Brazil, in late 2007 immediately increased Brazil’s reserves of recoverable oil by 50%. A similar story has been unfolding in West Africa. Nigeria and Angola lead the region in deepwater resources, with totals estimated at over 45 billion barrels. Even with these formidable reserves, offshore oil and gas production in West Africa increased from 842.7 Million Barrels of Oil Equivalent (MMBoe) in 2001 to 1,564.2 MMBoe in 2011, at an annual average growth rate of 6.2%, according to Global-Data, a natural resources data firm. As for the Gulf of Mexico, recent developments in the area have helped the area recover quickly from the BP oil spill disaster of 2010. In February 2012, the United States and Mexican governments signed an agreement to collaborate on increasing oil & gas sector development in the Gulf, allowing U.S. and Mexican companies to collaborate more closely on projects. The U.S. government also issued 44 drilling permits in the first quarter of 2012, putting it on pace to outpace 2010 and 2011 totals. All three of these regions that form deepwater drilling’s Golden Triangle have become more crucial to the global hydrocarbon narrative in recent years.

While the Golden Triangle continues to dominate deepwater production, it is also the least exciting region for observers of the deepwater drilling sector. The deepwater sector is a fledgling industry in East Africa; Anadarko Petroleum found oil off the coast of Mozambique just two years ago. Yet this past summer heralded a number of firsts for the region. The Apache Corporation in August began drilling Kenya’s first deepwater well, the Mbawa well, which may possibly hold over 5 billion barrels. Ophir Energy also hit its first gas find beyond the Rufiji river delta. These developments have many potential economic and geopolitical implications. Exporting these hydrocarbons from

the East African coast requires the development of hydrocarbon storage and processing facilities, and of the security infrastructure to protect these assets from hostile forces. This infrastructure is especially crucial in less affluent countries such as Somaliland and Madagascar who have both been touched by the oil boom and affected by the rampant piracy off the coasts of East Africa. Ophir Energy and Jacka Resources, an Australian company, have both taken strides in beginning hydrocarbon extraction operations in Somaliland. Unsurprisingly, given the potential for a resource boom in the area, China has followed suit. PetroTrans, a Chinese oil and gas firm is in the process of negotiation for a contract to undertake a project at the port of Berbera in Somaliland. There is little doubt that any deepwater discoveries off the coast of Somaliland will likely heighten the urgency with which China has been courting Somaliland. Deepwater drilling off of East Africa is an industry that though young, has impressive growth prospects, bringing hitherto unseen investment, growth, and international political players to the area.

Further East, India too has attempted to develop its own deepwater reserves. In 2005, India’s Oil and Natural Gas Corporation (ONGC) discovered gas in a deepwater well in the Krishna-Godavari basin off the coast of Andhra Pradesh. Reliance, Gujarat State Petroleum Industries and the ONGC have since drilled wells in the area. However, India relies on imports for over three-quarters of its petroleum needs and has not been able to develop its reserves quickly. The pace of exploration and extraction is processing at a slow rate, but certain new discoveries may re-energize the sector. Cairn India and the ONGC entered into talks with Sri Lankan entities on opening up exploration in the Mannar Basin, located in the Palk Strait between India and northern Sri Lanka. These developments appear at a time when India has been beset by crippling shortages of hydrocarbons. These shortages played role in the blackout that cut power to over 600 million people across Northern India during the summer. India’s ability to capitalize on its deepwater hydrocarbons will impact its economic trajectory, and is a crucial piece in determining whether India will become a “Great Power” of the modern era.

One thing that the “Golden Triangle”, East Africa, and India have in common is that their resources are generally located within sovereign territory. This makes the extraction and exploitation of these resources uncontroversial from a geopolitical stand-



point. The story in Southeast Asia surrounding deepwater drilling could not be any more different. The Spratly Islands serve as one of the focal points of international dispute within this region. An unassuming and only recently inhabited archipelago of 700 islands in the South China Sea near the Philippines and Borneo, they have grown in prominence due to immense fish and hydrocarbon resources. The Manila Bulletin reported estimates of \$26.3 trillion in hydrocarbon reserves located in their seafloor. Unsurprisingly then, China, Vietnam, the Philippines, Malaysia, Brunei, and Taiwan have all feuded over jurisdiction over the islands. The China National Offshore Oil Corporation (CNOOC) began drilling in the area in May 2012. In reaction to perceived

Chinese aggression, the Philippines in late September 2012 sent 800 marines to patrol the Spratly islands in conjunction with a new headquarters to coordinate operations. This juxtaposition of sovereignty disputes and innumerable resource wealth amplify the risks and rewards of deepwater drilling in Southeast Asia.

From the “Golden Triangle” to the Spratly islands, deepwater drilling has ascended to the high ranks of prominent hydrocarbon technologies. The sector is already interesting for its energy implications, but its implications for economic development and international relations firmly uphold its centrality to international business. There is treasure, and a substantial amount of it, at the bottom of the seafloor.



# Mobile Banking in Africa

BY LEILA EHSAN C'15

In 1984, cell phones began as a simplistic, expensive technology with only the capacity to make phone calls and with the semblance and weight of a brick. In recent years, the mobile phone has become an affordable and compact aspect of every day life all around the world. Texting, surfing the web, phone calls, and applications have made communications and management of our daily lives easier. However, if it seems cell phones have completely revolutionized developed economies, consider the case of Africa, where Africans are using cell phones to change the entire infrastructures of banking, political engagement, agriculture, the work force, and healthcare - and they're using them with technologies that have yet to be introduced to the more Westernized markets.

Cell phones have become a household staple throughout Africa, and the primary means of accessing the Internet on the continent. In 1998, there were fewer than four million cell phones on the continent. Over the past five years, the mobile phone industry has proliferated with a growth rate of 550%. Africa is the fastest growing mobile market in the world, and the second largest mobile phone market in the world, a rise attributed to an increasing middle class and a thriving banking industry.

There are currently 695 million mobile phone subscribers in Africa – an interesting statistic considering that the continent utilizes just 4% of the world's electricity. It is estimated that by 2016, there will be at least a billion mobile phones on the continent of Africa. In Nigeria alone, there are 100 million mobile phone lines, according to statistics by the Nigerian Communications Commission. The number of Nigerians accessing the internet via mobile phone has surpassed the number of those using desktop computers in October 2011.

**“ BANKING IN AFRICA HAS BEEN PROFOUNDLY AFFECTED BY THE USE OF CELL PHONES AND VARIOUS MOBILE PHONE TECHNOLOGIES.”**

Cell phones have given Africans, like the rest of the world, a means of sharing information and undergoing business transactions. Over the last decade, African companies have taken the potential of mobile commerce and altered the means by which Africans communicate. Short Messaging Service (SMS) has been the foundation of the mobile phone revolution in the beginning years of mobile phone usage in Africa. Now, internet usage and mobile applications have continued this revolution, affecting various sectors, including banking, politics, the work force, agriculture, and healthcare.

Banking in Africa has been profoundly affected by the use of cell phones and various mobile phone technologies. For example, SlimTrader, founded by Nigerian-American Femi Akinde, is an e-commerce firm that facilitates the exchange of goods and widens online markets

for Africans. SlimTrader has created a mobile technology allowing Africans to search for and purchase products via text message. SlimTrader has even partnered with Aero Airlines to enable transactions like buying plane tickets. Meanwhile, Kenya's largest mobile phone operator, Safaricom, launched a mobile money transfer service called M-PESA in 2007, which now provides services to 15 million Kenyans. According to a survey by the World Bank, in Kenya, Sudan and Gabon, more than half of adults use mobile money, which is used to pay bills and airtime, buy goods and pay individuals. According to some estimates, about a third of Kenya's GDP flows through M-PESA. M-PESA's success has sparked similar ventures in South Africa, Nigeria and Tunisia.

Mobile Money is being increasingly adopted by the developed world as a dependable payment system. There were attempts to implement it in the US but as of September 2012 this has been delayed – possibly because at the moment, mobile money transactions are limited to sending money to someone else only on the same platform, but there are ongoing talks to get different mobile money deployments to work together. Additionally, other companies are interested in using mobile money to expand their own enterprises. Fundamo, a decade-old South African software company, was just acquired by Visa, provides the technology that about a third of all mobile money systems use today. It is suggested that Visa has the resources and the systems to help open these closed systems. Visa is currently launching an initiative in Rwanda, where it has an agreement with the government to improve ATM'S and work on financial literacy. Additionally, Visa sees potential in this because emerging markets are helpful in Visa's plans for growth – Visa hopes to bring in 50% of its revenue from outside the United States by 2015.

Thus, there is much potential in mobile money to enable new types of transactions, commerce, transfer payments from the government to the poor, and even link those without a bank to a banking system.

Cell phones have also revolutionized the way in which activism and politics are carried out in Africa. The 2011 uprisings across North Africa illustrated the opportunities mobile phones grant for communication. For example, the Mubarak regime realized the potential for phones to change disenchantment among the populace into a resistance, and tried to pressure mobile phone networks to stop operating to reduce tension; on January 28<sup>th</sup>, 2011, mobile phone networks went dead. In 2008, after bloody elections in Kenya, citizens reported violence by text messages which were seen by the rest of the world. Mobile phones are bringing openness and transparency to govern-



ment behavior, which indicates that cell phones have the capacity to spur democratic development in addition to facilitating banking.

Cell phones have also become increasingly useful for those in the work force, and they have been vital in helping Africans find jobs. Umuntu Media is an African-based host website founded by Johan Nel, a Namibia native. Umuntu provides local news, job listings, and directories specified per country and region in which it operates. After only 18 months after launching, Umuntu operates in nine countries, and its Namibia portal, iNamibia, is the largest local Namibian website. Mimiboard, another idea of Johan Nel's has been in operation for a month. Mimiboard is a notice board created for a specific area, where people in each community can post a notice about wanting to buy or sell something and someone else can take up the offer through Mimiboard. It even has its own currency, "mimibucks", which incentivizes mobile transactions.

Cell phones have also revolutionized agricultural practices. Mobile phones have improved the lives of farmers – this is important considering that the agriculture sector is one of the largest employers on the continent. Most of those who work in the agriculture sector are smallholder farmers without access to financing or technology. Phones provide access to sharing weather information, market prices, and micro-insurance schemes, leading to higher earning potentials. In 2003, Kenya's Agricultural Commodities Exchange partnered with Safaricom to launch SokoniSMS64, a texting platform that provides price information to farmers. Meanwhile, iCow, a mobile app, is an SMS and voice service that permits dairy farms to track cows' gestation cycles. iCow also provides farmers with tips on nutrition and breeding. Additionally, cell phones have been useful in warning others about possible threats to their crops: farmers in Mauritania even use cell phones to communicate to other farmers in far regions to inform them about possible locust swarms or storms.

Finally, innovations in mobile cell phone technology has altered healthcare in Africa for the better. The World Health Organization has found that 30% of drugs supplied in developing countries are counterfeit. A 28 year-old doctoral student named Bright Simons came up with a system to fight counterfeit medicine in African countries. Simon

put unique codes within scratch cards on medicine packaging that buyers can send via text to a number to find out if the drug is real or not. This system has been adopted in Asia as well. Cell phones also allow Africans to find healthcare providers – a crucial necessity for Africans who live kilometers away from the closest urban center. In South Africa, Impilo is a service that allows people to find healthcare providers anywhere in the country 24 hours a day via mobile phones. And phone companies are realizing the effectiveness and potential lucrativeness of health and lifestyle tips, in addition to doctor's appointment reminders.

However, despite all the benefits that mobile phone technology has provided to the continent, many critics believe that this cannot be the only remedy for the intractable problem of development in Africa – cell phones have had the ability to revolutionize different components of African life, but they are not able to cure fundamental problems within African economies, governments, and societies. We must better evaluate mobile phone development projects in order to understand the impact on economic and social outcome, and determine whether mobile phone technology actually has the capacity to improve lives of those across all classes, not just the middle class in industry and agriculture. If mobile phone providers are interested in improving the public well-being, these industries need to work with public good provision and investment and argue for more transparent practices from corrupt governments. And we must consider the role of foreign direct investment in these mobile service companies and see how that impacts changes to African business and other aspects of life.

Albeit these criticisms, it seems that the African market does not only offer investment opportunities, but has also transformed the way in which mobile phones are traditionally used, leading to monumental gains in a country where development remains stubbornly low. A 2005 study conducted by the London Business School found that for every ten mobile phones per 100 people in a developing country, the gross domestic product rises by 0.5% - which highlights how valuable the mobile phone industry is to developing countries. If used correctly, the mobile phone industry will continue to improve quality of life for some of the world's most impoverished people by providing creative solutions to local issues.

# Post-Revolution: The Road to Recovery

BY OLA ABOUKHASIWAN C'15

From the tweet to the street, the Arab world has experienced unprecedented shifts of power. Social media has penetrated the lives of many in ways that cannot be undone. New York Times columnist Nicholas Kristof labeled the “quintessential 21<sup>st</sup> century conflict” one in which “on one side are government thugs firing bullets and on the other side are young protestors firing tweets”. For the longest time, national media channels have retained a strong influence on local public opinion, and although they may have previously been showered with accolades, they have also received their fair share of accusations of bias and misrepresentation. The emergence of technological platforms has allowed people to gather virtually to form a representative presence.

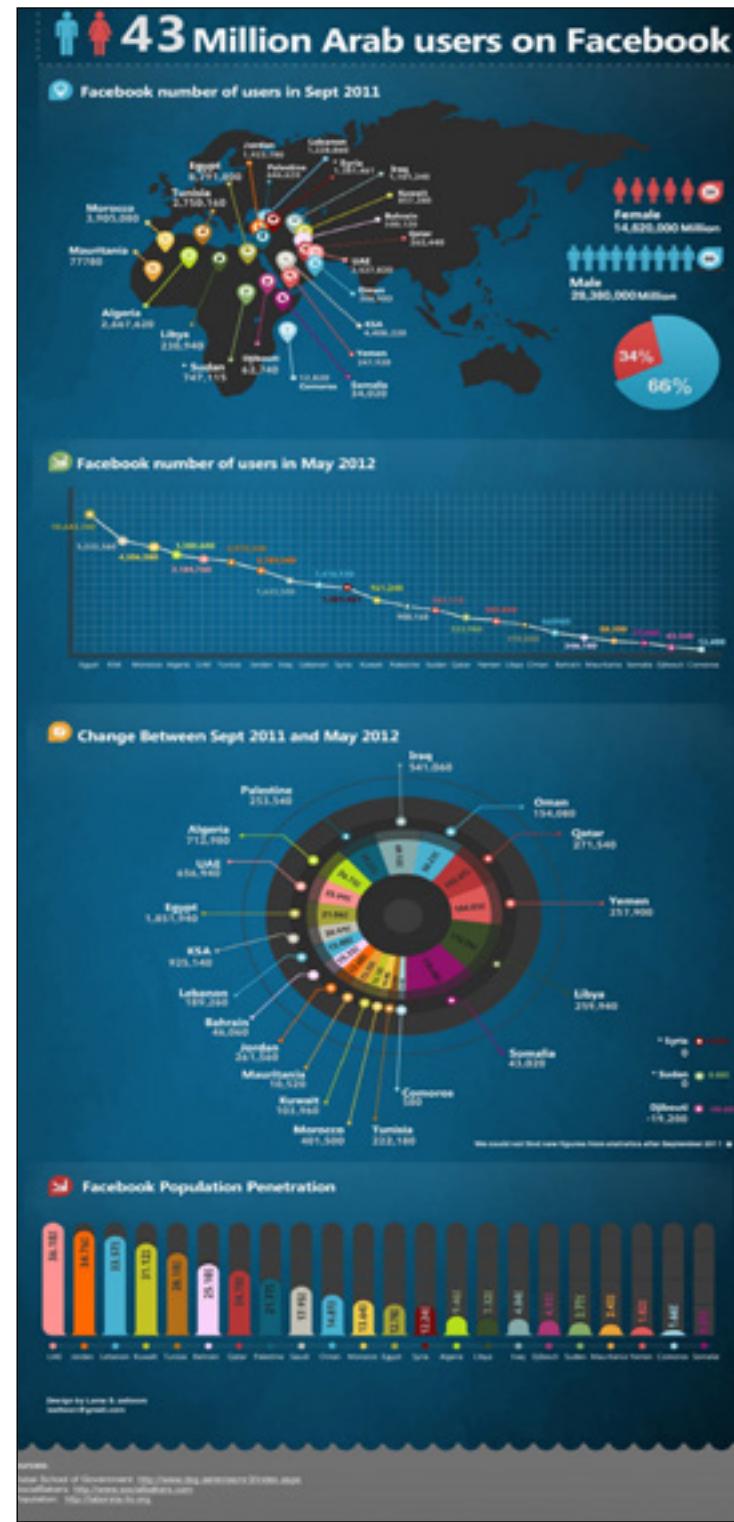
It is reasonable to ask why the Arab revolutions didn’t happen any earlier. For many, the Arab identity has been fragmented, ever since Nasser’s pan-Arabism. Pan-Arabism was an ideology that aimed to unite Arabs across the Middle East, particularly against the Arab world’s perceived enemies. While a national Arab identity was constructed, the paths to such unity were deconstructed, particularly after the 1967 Six Day War. In many ways, the aspirations that pan-Arabism was founded on were of delusional quality; chasing delusions can only instigate disastrous results.

Ever since the death of Nasser, the Arab world has been waiting for the arrival of a hero. Until recently, they have been pushed into a state of decline, despair and demise. Through social media platforms, citizens were able to extend the conversation, taking it from the living room to the public sphere, in a way that traditional media outlets could never have accommodated.

The Arab world’s ability to express itself has been revolutionized; with the click of a button, a public consensus can be generated—without censorship. The inaugural Arab Social Media Report reports that Facebook has gained more than 1 million new users in the region since the protests began.

However, it must be said that no longer are Facebook, Twitter and other social media platforms used solely for political expression and mobilization; Arab youth are taking it a step further. While the Facebook page Kullena Khaled Said — “We Are All Khaled Said” may have served a purpose, transitional times call for transformational tactics. With the rising usage of social media, Arab youth are capitalizing on this phenomenon in an effort to promote social entrepreneurship.

Social entrepreneurship resembles a perfect marriage of the desire to do good with a financially sustainable model. At times like this, social entrepreneurship is the most ideal



# 'Stealing' Their Way to Success



BY KAI-SYUEN LOH W'15

**G**ood artists copy, great artists steal," Picasso is known for saying. This shamelessness in stealing great ideas may have once been the bastion of art, but it is present in business as well. Stealing, as understood in the art world, does not refer to merely taking an idea that's not yours and making it your own, but rather extracting the essence of what works and transforming it, elevating it to a better form. This subtle skill is more nuanced than copying; and in today's business world, it's called innovation.

Technology has become ingrained in our lives, with tech companies dominating today's business scene. The rapidly evolving nature of technology means these companies must constantly innovate to remain relevant in the market. Innovative design has thus become an increasingly important factor in the business decisions of players in the tech world.

IBR examines three companies that inculcate innovation into the core of their business, and takes a look at what makes "stealing" great ideas the way to go in the tech world.

**Apple:** The trendsetter on the innovation block. It's impossible to separate innovation from Apple's culture. Product development in Apple involves producing not merely a good, functional product, but a whole experience surrounding that good. It's not about producing a working music player, Apple believes; it's about creating a host of supporting components, from software to accessories, to complement it. Apple's innovative genius lies not just in the functionality of the products it creates, but in the reinterpretation of those functionalities, packaged in designs that inspire users to new experiences using them. And they do it all through "stealing" - the notion of taking the essence of an existing great idea and elevating it to an art form.

This "experiential strategy" embraced by Apple involves knowing what users need before they know it themselves. Or as the late Apple CEO and icon Steve Jobs bluntly put it, "People don't know what they want until you show it to them." The execution of that philosophy is Apple's strategy. Apple designer Christopher Stringer has said, "Our role is to imagine products that don't exist and guide them to life."

A healthy dose of imagination and dreaming does not comprise all

of Apple's innovation strategy, though. The concept of simplicity has long been emphasized in the tech world, but Apple "stole" it and embraced it as a core part of its philosophy, transforming normal products into great ones. Jonathan Ive, Apple's design chief, said in an interview with *The Telegraph* that "Simplicity is not the absence of clutter, that's a consequence of simplicity. Simplicity is somehow essentially describing the purpose and place of an object and product. The absence of clutter is just a clutter-free product. That's not simple."

This "stealing" for Apple has paid off. Studies from the University of Essex showed that Apple users feel emotion akin to attachment towards a significant other towards their products; Apple's innovation thus extends beyond just our usage of their products to our feelings. A combination of an intuitive understanding of users and simple and elegant products has created a novel relationship between Apple and its customers. Through innovation, Apple transforms an existing idea, "building customer relationships," to a better one- essentially elevating this "theft" to an art form. Picasso would be proud.

**Amazon:** Essentially an online marketplace, Amazon may not strike the most of us as being innovative, mainly because innovation has the same connotation as "cool"; and who says a marketplace can be cool? However, Amazon has ranked among the world's most innovative companies, coming out number 2 on Forbes' recent list. Starting out first by selling books, Amazon managed to change the stale and staid book-selling industry. This astounding performance shows that innovation is not just about creating functionality through customer relationships, as the Apple study showed- it's also about changing an industry.

Amazon borrowed the typical book-selling industry idea and elevated it by creating a new business model, fundamentally changing the industry in the process. *Bloomberg Businessweek* lauded the company's innovation in turning its competitors into collaborators by allowing other retailers into its online storefront and changing its business from direct sales to a sales-and-service model.

Initially, around 1993, Amazon just sold books as an online book-

store. Rather than use the traditional models of mail-order catalogues and brick-and-mortar bookstores, Amazon completed its transactions online and therefore could process many more books. It had a direct sales model akin to the normal book seller- it processed the books in its stock, and sold them to customers, as they demanded them.

After around five years of using this model, Amazon started acquiring both established and start-up companies, from IMDB to purveyors of designer clothing, shoes, and apparel. With its numerous acquisitions and investments (among others Living Social, a website which offers local deals), Amazon borrowed the traditional direct-sales model idea and innovated it into a sales-and-service model; but with everything offered online. Far surpassing its original role as a bookseller, Amazon has become a veritable marketplace offering a smorgasbord of products and services.

Amazon also "steals" the traditional idea of utilizing collaborators in the supply chain, and has vastly changed the way that these retailers do business. Amazon.com operates retail web sites for retailers like Marks and Spencer's and Lacoste, opening them up to the entire online shopping community. Amazon has thus become a major mover and shaker in the online market.

**Google:** Innovation is not just a business strategy here, but a culture. In this sense, Google encourages "stealing" as a philosophy of "Google life" for its employers. Borrowing and updating good ideas is actively encouraged in the "Googleplex", where employees are encouraged to share all ideas, projects, and experiences.

Googler Susan Wojcicki, in an online article "The Eight Pillars of Innovation," said that "By sharing everything, you encourage the discussion, exchange and re-interpretation of ideas, which can lead to unexpected and innovative outcomes. We try to facilitate this by working in small, crowded teams in open cube arrangements, rather than

individual offices."

Sharing is little different from stealing, but, crucially, it emphasizes collaboration. In this innovation culture, ideas are introduced, explored by the group, and elevated to a better form. Additionally, Google believes strongly in the power of "open technologies." This practice refers to the ability for any developer within Google to change or improve the product as he sees fit. Only when pre-existing ideas are allowed to become malleable and transformed for the better does true innovation shine through.

These methods have shown that Google may just have the right formula for "creating" innovation, as its continuous expansion in the tech sphere shows an expertise in anticipating trends and getting ahead of them.

## Should They Steal?

Apple showed us how a company steals pre-existing great ideas and makes them even better through design and experiential innovation. Amazon showed us how innovation is more than a design of products; it's stealing the reimagination of traditional relationships in the market. And Google showed how "stealing" can become a driving force for market success.

What do these companies show us about innovation? They show us that innovation is multi-pronged, and is more than simply the creation of a product. They show us that innovation is a perspective. Innovation is a culture. And that innovation is a business decision that has tangible returns. In fact, innovation is the essential component that makes a tech company successful, and could be the lifeline of companies hoping to ride the tech wave.

All tech companies should look to stealing great ideas. As the essence of innovation, it's not about creation, it's about reshaping what has already succeeded and making it even better.



# Corning's James Flaws: Pushing Glass Further

INTERVIEWED BY RACHEL FLESZAR W'15

James Flaws currently serves as the CFO of Corning Incorporated, a leading manufacturer of a diverse range of products, including glass, ceramics, optical fiber, environmental technologies, and specialty materials. Corning has a proven track record of innovation, from the production of Thomas Edison's light bulb to its recent development of fiber optics technology and Gorilla® Glass. Flaws sat down with IBR to discuss his thoughts on the value of innovation, growth opportunities and potential threats in the technology sector, and the growing importance of emerging markets.

**I**nternational Business Review: Your career at Corning began right after you earned your bachelors degree in engineering at Tufts and your MBA at the Tuck School of Business afterward. How would you say your interdisciplinary background has served you in your career thus far?

Jim Flaws: Right away, Corning recognized the diversity of my educational background and acknowledged that having a technical background and a financial background would be useful to them. They actually did not try to pigeonhole me into one type of career or another. They said from the beginning I could move back and forth if I wanted. What I found was that though I spent most of my time in finance, the discipline of engineering and engineering analysis helped me to succeed in finance, and for a brief time I ran some of Corning's businesses. So I think it was a real asset to have both in my background.

IBR: What drew you to Corning originally and what has kept you there since?

JF: I stayed for many reasons. I like the culture and the values of the company and I ended up finding quite a diversity of opportunities. I've been in finance early in my career and then later in my career, but in the middle I ran some of our smaller businesses as a general manager. I got to do a lot of mergers and acquisitions work - I had the opportunity to be involved in communication programs in legal matters. Basically, the breadth of opportunity has been great, kept me refreshed, and has been a constant chance to grow and learn. Even in the latter part of

my career, I still feel I'm doing that. And then, lastly, I've liked all the people here and that's an important part of wherever you are - enjoying the people.

IBR: You mentioned Corning's Values, and Corning is known as a company that truly incorporates its corporate values into the workplace. Of the seven Values, which would you say are the most important and how do they drive business activity at Corning?

JF: I'd have to say we regard all the Values as important to us, and we try to live all seven all the time and we try to weave them in our everyday life. As CFO, I clearly pay a lot of attention to the integrity value, which is foremost in my own mind, but I'm dedicated to the others also. I think if I had to pick three that leap out at me most of the time they would be integrity, our treatment of the individual, and then leadership as a value in everything we do. But I think they are all very important.

IBR: Growth through innovation has been key to Corning's success for many years. Would you say Innovation is one of the more important Values as well?

JF: Yes, I think it's probably one of the things that has kept the company going for such a long period of time. A few years ago we crossed the hundredth anniversary of having a centralized research and development laboratory. It is that commitment to innovation that has led to a lot of Corning's longevity, so it's really an important Value. Some people, they don't quite



**INTERVIEW:** James B. Flaws, Vice Chairman and CFO, Corning Incorporated

**“ IT IS THAT COMMITMENT TO INNOVATION THAT HAS LED TO A LOT OF CORNING'S LONGEVITY.”**

The Corning Museum of Glass



understand us associating innovation as a value, but it's really a belief statement about how we do business. That's often how I explain the Values to people, by saying that these are beliefs about the company, beliefs about how we should operate, beliefs about how we should treat people and treat customers, et cetera.

**IBR:** You mention Corning's longevity and having an independent R&D center for over 100 years. Corning as a company has survived independently for about 160 years now, at a time when the average company lifespan is only about 40 years. In your opinion, what is the key to Corning's longevity?

JF: What I see as the most important thing has been the company's willingness to change. That change can come in the form of selling different products and having different business models. An example is sometimes we've had services businesses and sometimes it's all products. Another key would be our ability to change as markets grew overseas, so not just being a US-centric company. I think the number one attribute of our history has been the ability to change. The second one, as we spoke about a moment ago, would be our commitment to research and development, and technology and continuing to spend over a hundred years on it. The interesting thing about that is we do it in both good times and bad times. It's one of the things that I think is unique about Corning. When recessions come along, we may trim our spending a little bit in R&D but not very much; it's one of the things we try to protect. So I think it's those two aspects: the ability to change and the ability to concentrate on research and development that have led us to be around 160 years.

**IBR:** One very successful product of R&D has been Gorilla Glass, which is probably Corning's most well known product

among consumers, and has been very successful in the markets for LCD TVs and smartphones. Would you say that the state of the economy is negatively affecting these markets and, by extension, limiting Gorilla's growth?

JF: Gorilla today is primarily on smartphones and tablets. They are products that are relatively resistant to economic pressure. First, they don't have huge price tags, and second, they're meeting an emerging, very strong trend that people want mobile transmission of data and want to interact with things through touch. So it's actually an area where I think people are prioritizing their spending; in tough times, they still think that this is important. I'm sure there are some people who, in economic and challenging times, can't afford to buy a smartphone or a tablet. But I would say of all our products, the Gorilla products have probably been the most resistant to these weaker economic times.

**IBR:** One of Corning's most recent innovations has been Willow Glass. What are the core features of this product and where do you see this product a few years from now? Do you foresee its success ultimately matching that of Gorilla?

JF: Willow is actually very different from Gorilla. It's kind of a step-change in technology because it is an ultra-thin glass product, and it's flexible. Most people think of glass not bending, but this actually can bend and we can actually wrap it around a reel. With Gorilla, we had a customer who needed a strong piece of glass and we knew who the customer was from day one. With Willow, it's a different focus. We have capabilities in the product—this flexibility, this ultra-thinness—but we don't have a customer yet. We've invented something and we have ideas where it might be used, but it's very early and we're actually

talking to customers in a wide range of fields because it's such a different thing to have ultra-thin, flat, smooth-surface glass that bends. It's probably too early to say how successful it will be. Whether it will turn out to be as big as Gorilla or not, we would certainly love to have that occur. I would say it is potentially more of a revolutionary product than what Gorilla is.

**IBR:** It certainly demonstrates your ongoing commitment to innovation. I'd like to change topics a little bit and discuss some of the opportunities and threats you see in global markets. With your telecom sector in mind, given that the percentage of people with access to the Internet is still low in countries like China and India, do you see these emerging markets as playing a big role in the future of the telecommunications sector and of Corning in particular?

JF: We believe the emerging markets will be a strong, higher growth opportunity for telecom for a number of years. Actually, I'll take China as an example: the market for optical fiber in China today is the world's largest market for optical fiber and in fact, we sold more optical fiber in China this year than we sold globally back in 2000, the previous peak. We expect that we will see growth in telecom continuing in China and in India also. India is a little different because there is less infrastructure today; for example, there isn't as much electrical power. That may actually mean that there's more mobile devices and people get their Internet over that and it goes to cell towers rather than being on wired lines. Clearly India will need lower cost solutions than what we do in some other places. But we ultimately believe that Internet usage will spread everywhere on the globe and therefore our telecom business will continue to grow very nicely as it spreads around the world.

**IBR:** Keeping with the China theme, as GDP and consumer spending continue to rise in China, so do TV sales, which is good news for your Display Technologies segment. Do you see any differences in the nature of demand between these American and Chinese demographics?

JF: In terms of our consumer products, with the consumer demographics, we don't see a tremendous difference. Televisions—LCD televisions—are growing very rapidly there and are displacing the previous technology, cathode-ray tube technology. Pretty much along the same S-curve penetration we saw in the developed economies like Europe, the United States, and Japan earlier. In terms of cars, the number of cars per individual in China is still much lower than in the US and Europe, but it's moving up and all cars in China today have catalytic converters for pollution. So we see the Chinese consumer following the same patterns. Obviously they don't have as much money to spend per individual as we do in the developed economies, but they want televisions, they want cars, and they want phones, so we see ultimately the Chinese economy mirroring the developed economies in that regard.

**IBR:** I remember reading a statistic that Chinese consumers

## JAMES FLAWS



James B. Flaws is responsible for all financial functions at Corning Incorporated, including Accounting, Control, Investor Relations, Shared Services, and Treasury. In addition to his financial duties, he also oversees Legal and Corporate Communications.

Flaws joined Corning Incorporated in 1973 and has held a variety of positions including assistant treasurer; vice president and controller; senior vice president and treasurer; chief financial officer; executive vice president and chief financial officer; and was elected to Corning's board of directors in December 2000. In April 2002, Flaws was named vice chairman, in addition to chief financial officer.

Flaws is on the board of directors for Dow Corning Corporation; chairman of the board of trustees for the Corning Museum of Glass; and a member of the board of trustees of the Corning Foundation. He is active with the local United Way, where he served as a board member for 17 years and board chairman for three years.

Flaws graduated from Tufts University with a bachelor's degree in engineering and received a master's degree from Dartmouth College. He was named a member of The Conference Board's prestigious Council of Financial Executives in May 1999. Institutional Investor magazine named Flaws one of America's Best CFOs in 2006, 2009 and 2010.

actually demand larger TVs than Americas do, which I found to be somewhat counter-intuitive. Is that really the case?

JF: That's true. If you look at the average size in a country, China has actually for quite a period of time been the largest. We believe it's somewhat cultural in that there is often one television and a number of people living in the same family unit. Therefore, they like to have a large television to serve as a center gathering point. So it actually has been the largest one for quite a number of years. I will say the rest of the world is catching up to that. Larger televisions are growing much faster than smaller ones. For smaller ones the growth has gone negative as the prices [on larger ones] come down so much. In the United States this year, the fastest growing segment of televisions is ones that are 50 inches and above.

**IBR:** Although consumer spending has been growing in China, the overall rate of economic growth is slowing down. How do you anticipate this slowdown will impact the technology sector and how are you preparing for this economic uncertainty?

JF: I think the Chinese economy is slowing and that's because it has three broad components to it: the consumer, exports (which is a large component), and the infrastructure spending that the Chinese government has done to build up the country and modernize it. We believe over time that the infrastructure spending will be lower and of course the export part of the economy will be subject to how other world economies are doing. Also, China will begin competing with other emerging coun-

**“**I THINK IF YOU CAN FIND A POSITION THAT IS SOMETHING THAT ALLOWS YOU TO GET UP EVERY MORNING AND TAKE ENJOYMENT FROM YOUR WORK, IT WILL OBVIOUSLY MAKE YOU HAPPY AND...PAY OFF WITH SUCCESS.**”**

tries that want to export. But we think consumer growth will still be solid in China and we do not see that big of an effect on the tech industry, because as countries move up from the emerging and developing status to developed status, technology becomes more important. As a tech company, we still believe we have great opportunities. Obviously, we pay a lot of attention to what Chinese consumers are doing, but we think they are moving to products that have more technologies, so I think the tech industry still has a bright outlook in China.

**IBR:** We've touched on Display and Telecom—what opportunities do you anticipate for Corning's other businesses? For instance, do you think Corning's Environmental Technology business will be able to capitalize on the trend of tightening

environmental regulations?

JF: Yes, we think our Environmental business has great prospects. I think if you ask the average person around the world if they like pollution, whether it's in the air or in the water or in the ground, they would say no. But no one ever acts to do something unless there's a law passed and there's regulation put in place. What we have found is over the last forty-plus years, environmental regulation has spread around the world. The best example of that would be in the 1970s when, for the first time, automobiles in the United States had to have an emission control device. Now, almost every car around the world has one. Once people get things like that, people want tighter regulations. For example, the United States is well down the road of tightening their regulations. We're now seeing that in emerging markets as well, so we continue to believe that environmental control products is a big opportunity for us. But we know that it's all going to be dependent on regulations and those regulations will come at a pace that fits the economies of the countries they're in. Not all countries can move right away to the tightest regulation, but over time we think they'll tighten everywhere so our prospects for our Environmental business are quite strong worldwide.

**IBR:** So you would say the trend of tightening regulations will exist throughout the world, in both developed and developing economies?

JF: We absolutely believe that. That is what people will demand of their governments, particularly as they move up the

economic scale, from emerging to being more developed. And therefore governments will gradually enact that, and that is what we've seen today, where the most prevalent pollution comes from cars. But, we're also seeing it in electricity generation, where people are looking for control of coal burning and pollution from that. Through one of our joint ventures, we sell a product for that. So we believe it will continue.

**IBR:** I'd like to talk a little more about Corning's recent history. Corning was dramatically affected by the dot-com bubble bursting in the early 2000s. Would you say this has changed the company's outlook on risk and its cash policy? Would you say this helped make you more prepared for the 2008 recession?

JF: The short answer is: yes. It clearly did have a big effect



on our thinking about how we manage risk and particularly the balance sheet of Corning. In 2002, our portion of the dot-com collapse was really the telecom industry and we took some strong lessons. The most important one is that we have a very strong balance sheet. We characterize that by two things: one, we want to always carry more cash than we carry debt; and second, the debt we do have we have spread out over quite a period of time, so there's never a large amount coming due in any one year. We've also changed some of our risk thinking in terms of the telecom collapse, when we were misled by some of our customers. They took our product, assembled it, and sold it to other customers, and it was that secondary customer that had business failures. So now, we pay a lot of attention to not just our customers' business models, but their customers' business models if they're selling the product to somebody else. The last thing we realized out of it is that it's very difficult to predict the world. Sometimes recessions occur or there's volatility in a business, and one of the other things from a risk mitigation perspective is we realized we needed to have a skill set of being very agile and nimble, to move quickly and move through a denial phase when bad things occur. So we took real lessons out of the telecom crash and applied them to our balance sheet and also to how we run our businesses.

**IBR:** Would you say that that experience has also impacted how you view new opportunities such as those we discussed a few moments ago?

JF: I don't think it has kept us from trying to pursue new business opportunities. But what it has done is prepared us for when some of these opportunities turn out to be slower incom-

ing, we have the financial strength to wait it out. A good example of that is a new business we have in diesel particulate filters where we knew regulations were going to enforce them, but the market developed more slowly than we expected. It took quite a while for us to edge into profitability. We did not shy away from taking the risk of developing the new product, but we always make sure that we have the financial strength in case our projections don't turn out to happen at the pace we originally thought they would.

**IBR:** One final question: you have led a very long and auspicious career, having twice been named one of America's Best CFOs by Institutional Investor. What advice would you give to Penn students just entering the job market, particularly those interested in the technology sector?

JF: Well hopefully they can find a job: it's a tough economy. I would say try to find an opportunity that gives you something that you like to do. It doesn't have to be the highest paying job. I think if you can find a position that is something that allows you to get up every morning and take enjoyment from your work, it will obviously make you happy and I believe will pay off with success. So I would say, find something that you like to do, which is probably the most important thing, and obviously you want to get paid for it. My only other advice is probably more mundane. On a simple level, it's to work hard and make sure you treat people you work with, whether they're above you, equal to you, or below you in the hierarchy, all the same and as you would like to be treated. I think those things bring you great success no matter what field you go into.

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Pictured above from left to right: Rebecca Friedemann, James Calvo, Tiffany Tzeng, Lauren Zakarian-Cogswell, and Rachel Fleszar. Not pictured: Allison Collins, Shana Mansbach, and Yamini Nabar.

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# Technology and Innovation in Business

BY MATTHEW KIM C'15

*In the past twenty years, technology has changed the face of business. From increasing efficiency to expanding opportunities for growth, technology has enabled companies across all types of industries to enhance their relationships with consumers while encouraging and accelerating innovation. Members of our distinguished Wharton faculty provide their insight into the ways technology has impacted their respective disciplines.*



## HOW IS TECHNOLOGY CHANGING THE TRADITIONAL APPROACHES TO MICROECONOMICS?

“TECHNOLOGY CHANGES THE COST OF PRODUCING CERTAIN PRODUCTS AS WELL AS WHAT PRODUCTS CAN BE OFFERED. CONSEQUENTLY, TECHNOLOGY ALLOWS US TO SEE WHAT FIRMS DO AS THEIR COSTS CHANGE AND THEY INTRODUCE NEW PRODUCTS ONTO THE MARKET. THINK, FOR EXAMPLE, OF NETFLIX. IT CHANGED ITS PRICING TO ACCOMMODATE CHANGES IN TECHNOLOGY. THEY WENT FROM A BUNDLING [STRATEGY] OF THE STREAMING BUSINESS AND THE DVD-BY-MAIL BUSINESS, AND THEY SWITCHED TO A PRICING PLAN WITH INDIVIDUAL PRICES FOR EACH SERVICE. I THINK ONE OF THE REASONS FOR THAT CHANGE IS THAT TECHNOLOGY MAKES IT CHEAPER TO DELIVER STREAMING CONTENT.”

ONE THING THAT'S HAPPENED RECENTLY IS THAT RESEARCHERS WHO STUDY THE LABOR MARKET AND HOW WORKERS RESPOND TO WAGE CHANGES HAVE STARTED TO USE AMAZON'S MECHANICAL TURK AS AN ENVIRONMENT TO CONDUCT RESEARCH. MTURK IS A PLATFORM WHERE PEOPLE FROM ALL AROUND THE WORLD CAN LOG IN AS A WORKER AND DO QUICK TASKS FOR LOW WAGES. IT'S IDEAL FOR SOMETHING THAT YOU WANT DONE QUICKLY — AT AN ALMOST AUTOMATED LEVEL — BUT THAT HAS TO BE DONE BY PEOPLE, SUCH AS CATALOGUING IMAGES. WHAT TECHNOLOGY HAS ALLOWED IS GLOBALIZATION ON A VERY PERSONAL SCALE. THIS IS A VERY INTERESTING MARKET IN ITSELF; IF WE WANT SUBJECTS FOR A SURVEY OR FOR A RESEARCH STUDY, WE CAN LAUNCH IT ON MTURK AND HAVE RESULTS WITHIN HOURS.”

— PROFESSOR JUDD KESSLER, BUSINESS ECONOMICS AND PUBLIC POLICY



## WHAT DRIVES INNOVATION IN MARKETING?

“DATA DRIVES INNOVATION IN MARKETING. YOU ARE ABLE TO LOOK ACROSS HUNDREDS OF THOUSANDS OF CONSUMERS MAKING DECISIONS IN REAL TIME AND COME UP WITH WAYS TO HARNESS AND UNDERSTAND WHAT THAT DATA MEANS WITH RESPECT TO HOW YOU SHOULD CHANGE OR ADAPT YOUR STRATEGY. A LOT OF COMPANIES ARE SPROUTING UP NOW TO PROVIDE THESE COMPETITIVE METRICS. THE FACT THAT TECHNOLOGY IS ALLOWING US TO MEASURE THINGS THAT WE COULDN'T DO BEFORE HELPS US GET A BETTER SENSE OF WHAT CONSUMERS ARE DOING IN THE MARKETPLACE. THE ABILITY TO GATHER INFORMATION QUICKLY AND ON A LARGE SCALE IS WHAT IS REALLY DRIVING INNOVATION.”

— PROFESSOR AMERICUS REED, MARKETING



## HOW IS TECHNOLOGY CHANGING THE TRADITIONAL APPROACHES TO STATISTICS?

“I WOULD SAY THAT THE CHANGE HAS BEEN TAKING PLACE GRADUALLY OVER A LONG PERIOD OF TIME, BUT IT HAS REALLY ACCELERATED WITHIN THE LAST FIFTEEN TO TWENTY YEARS. THE MAIN DIFFERENCE IS THAT TODAY'S STATISTICS RESEARCHERS AND PRACTITIONERS ANALYZE VERY, VERY LARGE SETS OF DATA. THE TECHNOLOGY THAT HAS PLAYED A ROLE IN THIS IS THE CONTINUED DEVELOPMENT OF MORE POWERFUL COMPUTING MACHINES. PRICES ARE COMING DOWN AND THE ABILITY TO STORE AND PROCESS ENORMOUS AMOUNTS OF DATA IS NOW AVAILABLE. IN ORDER TO MAKE THIS WORK, YOU ALSO HAVE TO BE ABLE TO COLLECT THE DATA.”

— PROFESSOR PAUL SHAMAN, STATISTICS

# IBR's Favorite Things

## BookBook for iPhone from Twelve South

AN IDEAL ACCESSORY FOR THE PEDANTIC AND ROMANTIC iPhone LOVER, IS MY LATEST TECH OBSESSION. IRONICALLY, I PROBABLY LIKE IT TO THIS EXTENT NOT ONLY FOR ITS DUAL IDENTITY AS A PHONE CASE AND A WALLET, BUT ALSO BECAUSE IT ADDS A BIT OF OLD WORLD CHARM TO MY OTHERWISE DIGITALLY OVER-RIDDEN ROUTINE.



-LAUREN ZAKARIAN-COGSWELL,  
SENIOR EDITOR

## Lacie Hard Drive

HAVING CRASHED MY LAPTOP'S HARD DRIVE ON SEVERAL OCCASIONS, THIS PRODUCT HAS BEEN A LIFE SAVER! IT'S ALSO LESS EXPENSIVE THAN SOME OF THE OTHER ALTERNATIVES.



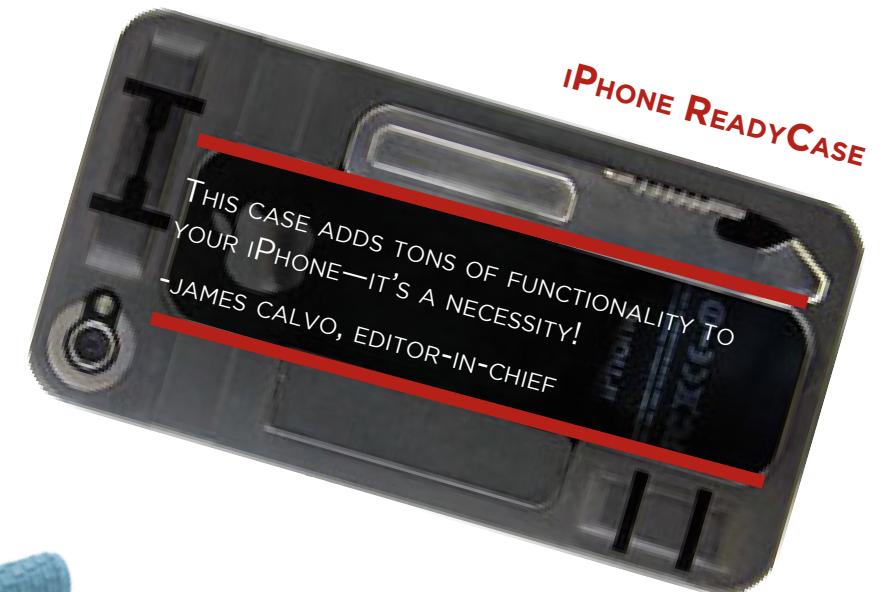
-RACHEL FLESZAR, VP DISTRIBUTION

## Echo Smartpen from Livescribe

EVEN THOUGH PRETTY MUCH EVERYONE ELSE AT PENN TAKES NOTES ON THEIR COMPUTER I STILL TAKE MINE BY HAND AND LOVE THE CONCEPT OF A PEN THAT RECORDS AND REMEMBERS WHAT YOU'RE HEARING AS YOU WRITE.



-REBECCA FRIEDEMANN, VP DESIGN



## Brookstone Silicone Keyboard for

CAN BE TRANSPORTED SUPER EASILY AS IT ROLLS UP, AND IT MAKES TYPING ON THE IPAD WAY EASIER.

-ALLISON COLLINS, EDITOR



## Everpurse

FOR THE AUDIOPHILES ON THE GO, THIS SUPERSTYLISH ZIPPERED CLUTCH KEEPS SMARTPHONES FULLY JUICED SO YOU'LL NEVER AGAIN HAVE TO WATCH IN HORROR AS YOUR BATTERY SLIPS DOWN TO 10% BEFORE NOON.

-TIFFANY TZENG, VP SPONSORSHIP



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Until pianist Kathryn Stott helps Yo-Yo Ma bring out the best in a composition, she will not rest. (Berlin, 2011.)



## What can your financial advisor learn about *chemistry* from Kathryn Stott?

Kathryn Stott knows every nuance of  
Yo-Yo Ma's playing style.

She can anticipate the slightest change in his tempo.

Sense the subtlest alteration in the pressure  
he applies to his bow.

The result is perfect harmony.

We aim to achieve the same working harmony  
with our clients.

To recognise your entrepreneurial spirit,  
and understand the challenges and opportunities you face.

Responding with the advice and insights  
that can help you better manage your portfolio.

To be your trusted advisors in tune with your  
goals and ambitions.

Until then...

*We will not rest*  UBS