



NOW 2014

NAVIGATING OUR WORLD



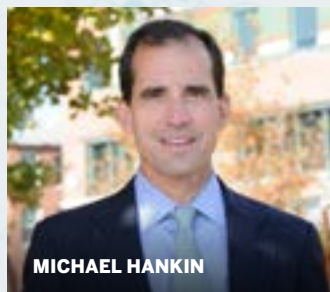
THE CONFERENCE IN REVIEW

Brown Advisory recently hosted NOW 2014, our biennial forum for provocative inquiry into the trends that shape our world and influence our investment thinking. We explored those trends over the course of 17 panel discussions and keynote presentations, and in these pages we offer summaries and our thoughts regarding each of those sessions.

A Note from Michael Hankin, President and CEO of Brown Advisory

It was incredibly exciting to have so many clients and friends attend our fourth NOW conference on April 28 in Washington, D.C. NOW, which is short for “Navigating Our World,” is Brown Advisory’s biennial conference that attempts to make sense of the issues today that affect the world and the investment landscape. We invite speakers to present their independent views on what we think are some of the most pressing and impactful themes facing society in the years to come.

Thinking about the future, without constraints and distractions, is crucial to our clients and our business, and something for which I feel a great deal of personal responsibility. What can we do today to help our clients be more successful five, 10 and even 25 years from now? How



MICHAEL HANKIN

can we help them think long term? How can we help them achieve their goals, regardless of what might happen in the world?

This review document is a small step in making sure the thoughts shared by all of our presenters and guests receive critical follow-up and reflective thought. A broad cross-section of members of our

investment team offer summaries of the panel discussions and keynote presentations as well as a sense of how these topics are impacting our clients’ portfolios. Additionally, we cover some of these topics more thoroughly in the June issue of *The Advisory*, our quarterly investment newsletter.

Importantly, we know that we do not have all of the answers. What we do know is that if we want to make sure that we are constantly challenging ourselves to further succeed for our clients, we must ask questions and listen to those around us. Embracing outside views is a hallmark of our firm’s culture, and we believe strongly that it helps us to make better investment decisions on our clients’ behalf.

Thank you for your support, and we hope you enjoy this special publication. Please share with us any thoughts or questions you have regarding the NOW presentations or the topics covered in these pages.

Sincerely,

Michael Hankin

- 3** [DEMOGRAPHICS AND THE FLOW OF CAPITAL](#)
- 4** [THE NEW NEW ECONOMY](#)
- 5** [BEYOND LEANING IN: THE LINK BETWEEN WOMEN’S LEADERSHIP AND BUSINESS SUCCESS](#)
- 6** [THE SECOND MACHINE AGE: WORK, PROGRESS AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES](#)
- 7** [FOSTERING THE NEXT GENERATION OF INNOVATION](#)
- 8** [WHAT IS AMERICA THINKING?](#)
- 9** [FAITH, FUNDAMENTALISM AND ECONOMIC GROWTH](#)
- 10** [FORCES OF DISRUPTION](#)
- 11** [3D PRINTING: PARSING REALITY FROM HYPE](#)
- 12** [IMAGINING THE FUTURE: A CONTRARIAN THESIS](#)
- 13** [DRIVING SUSTAINABLE PROFITS IN A RESOURCE-CONSTRAINED WORLD](#)
- 14** [THE PATH TO LONG-TERM SUSTAINABLE GROWTH IN CHINA](#)
- 15** [INVESTING IN AFRICA’S EMERGING CONSUMER CLASS](#)
- 16** [FROM COMPUTING TO THE CLINIC: HOW BIG DATA IS TRANSFORMING MEDICINE](#)
- 17** [WAR, PEACE, AND THE FUTURE OF GOVERNANCE](#)
- 18** [UNLOCKING THE MYSTERIES OF THE BLOOD-BRAIN BARRIER: THE FRONTIER OF BRAIN SCIENCE](#)
- 19** [CYBERSECURITY: JUST AN ILLUSION?](#)

Demographics and the Flow of Capital

SPEAKER:

ALAN MURRAY

President, Pew Research Center

As world economies become increasingly interdependent, the “W” in NOW warrants a deeper look: Only by studying a truly global population can we really say that we are navigating our world. At this session, Alan Murray, president of the Pew Research Center, helped us to do just that by walking us through some of the forces shaping world economies. In particular, he focused on how economic attitudes, technology and other demographic trends are shaping the emerging middle class around the world. He believes that the hopes and frustrations of this newly empowered population will have a major influence on the long-term growth and direction of emerging markets.



ALAN MURRAY

Mr. Murray started the presentation with some interesting statistics around perception. How do those who live in emerging markets view their current situation and prospects for their children? Surprisingly, emerging markets have a much higher level of embedded



optimism than developed markets: roughly 58% of citizens in a sample of emerging-market economies believe that their children will be better off than they are, compared to only 28% of citizens in a sample of developed economies. Despite this optimism, emerging-market citizens are still aware of the significant issues they face. For example, inequality is viewed as a major problem. In China, the rich-poor gap is consistently among the highest perceived problems, behind only concern about inflation and corruption. Mr. Murray made an interesting point here: As per-capita income increases in an economy, the list of problems that citizens find concerning actually increases. Once basic food and shelter become less of a concern, people can direct their attention elsewhere, and they become sensitive to things like the safety of available medical drugs or the quality of consumer products.

He then described the tight relationship between technology penetration and societal wealth in emerging economies. He noted an 80% correlation between GDP per capita and growth in Internet usage among citizens, and the growing importance of mobile phone

penetration in developing nations, particularly with respect to their use as payment devices. Without traditional banking structures, mobile phones have become a means for citizens in many markets to transact and conduct business—something that was previously impossible.

Mr. Murray made a clear point that current demographic trends will inevitably shape future capital flows—not necessarily in the near-term but assuredly over time. Mobile-phone penetration is a good example: Capital can flow more freely to emerging consumer economies once their citizens have access to a transaction platform. As long-term investors, we share a similar view but need to take it a step further. It's not enough to align ourselves with a favorable trend, such as mobile phone payments. We need to find the right companies and the right business models that can leverage those trends effectively and sustainably.

—Kenneth Coe

Equity Research Analyst

The New New Economy

Statistical and manufacturing pioneer William Edwards Deming was fond of saying, “In God we trust; all others must bring data.” That is certainly a lesson that Glenn Hutchins took to heart as he discussed the state of the economy with the NOW audience, armed with statistics from the National Bureau of Economic Research, the Bureau of Economic Analysis, the International Monetary Fund and many other sources. His experience in both the public sector as an economic



GLENN HUTCHINS

advisor for President Clinton and in the private sector as co-founder of technology buyout firm Silver Lake Partners has given him a powerful and wide-angle lens with which to view both macroeconomic policy and investment opportunity.

Two years ago, Mr. Hutchins offered attendees of our NOW 2012 conference a bleak economic outlook, and while his remarks this year were relatively upbeat in comparison, he still did not paint a particularly optimistic picture. He began with a review of progress

in the U.S. since the financial crisis of 2008-09, noting that economic recoveries since World War II had averaged 59 months in length, which would put the U.S. squarely in the mature phase of its current recovery. Despite that maturity, the recovery has been underwhelming. Recovery of real GDP, nonfarm payrolls and home prices has been weaker during this recovery than in any other in the post-WWII era.

Despite the muted top-line GDP growth number, he reminded us that the U.S. is a big place and there are still areas that are thriving. Several months ago, he visited North Dakota, an epicenter of the country's oil and gas production renaissance. He was shocked to find Walmarts that couldn't find enough employees, even when offering double the minimum wage; customers needed to walk through aisles of unloaded shipping pallets to retrieve the items they wanted.

While the economic recovery as a whole has been uninspiring, equity markets are near all-time highs. Investors have compared the current market to the market bubble of the late 1990s, but Mr. Hutchins believes that such fears are misplaced. He offered statistics to show that valuations today are quite modest compared to the late-1990s timeframe, while corporate earnings have been strong and are holding up relatively well.

His overall grade for the U.S. economy, then, might be “so-so”—not particularly good, not particularly bad. He noted that Americans should feel pretty good in comparison to Europeans struggling through a

SPEAKER:

GLENN HUTCHINS

Co-Founder, Silver Lake;

Vice Chair, The Brookings Institution

much-uglier economic environment. Overall economic growth in Europe is flat, but that does not tell the entire story. Northern Europe weathered the downturn fairly well, but Southern Europe was hit extremely hard: Spain, Portugal, Italy and Greece have seen a sizable cumulative loss in GDP since the crisis, ranging from -6% for Spain to a whopping -24% for Greece. He warned that European economies face a real risk of deflation, under which economic activity would grind to a halt. He also pointed to the recent setbacks in emerging markets as of late. Emerging-market growth rates have declined considerably, and today developed economies are contributing more to global GDP growth than emerging economies.

Mr. Hutchins concluded with his belief that the economy we have had over the last few years is the one that we are going to get for the foreseeable future, based on his view that all GDP components are growing as quickly as can be reasonably expected at the moment. As he did two years ago, he stated that in a low-growth environment, investors need to proactively seek out the parts of the economy that are growing, such as opportunities in U.S. energy production or those sectors of the economy that are producing real innovation and disruption. We could not have hoped for a better segue into the rest of the NOW conference, where we discussed many of those long-term growth opportunities.

—Peter Whitney

Open Architecture Analyst

Beyond Leaning In: The Link Between Women's Leadership and Business Success

Brown Advisory's Dune Thorne began this NOW session with some staggering data to frame the lack of gender diversity in the current business environment. In the U.S., women earn 58% of the undergraduate degrees conferred each year, they have received more Ph.D. degrees than men since 2010, and 72% of valedictorians are women. Yet they are sorely under-represented in the upper echelons of business. In the U.S., women make up 58% of those entering the workforce, but just 25% of senior-level positions, 12% of CEOs, and only 4% of CEOs in the Fortune 500. Those are the facts, which raise important questions for businesses. Is this disparity necessarily a bad thing? Can we fix this if we try? Will U.S. businesses do better if we fix this? Those questions may sound insensitive, but they are important first steps before considering proactive efforts to increase gender diversity in executive ranks.

Several studies suggest that executive gender diversity does in fact correlate with stronger business performance. A 2012 Credit Suisse study found that of 2,360 global companies, those with women in director positions had higher returns on equity and faster earnings growth rates. A Harvard study released this year looked at board composition and found that boards with a critical mass of women were twice as likely to request further information from their executive teams and to take initiative in strategic business decisions. In addition (and perhaps as a result), ROE and profit margins were considerably higher for that group.

Each panelist emphasized that when companies make a conscious effort to increase gender diversity, by default they are also investing in an effort to increase merit-based hiring and promotion decisions. Diversity for the sake of diversity doesn't work and is not sustainable, but hiring approaches that seek to remove unintentional biases and stereotypes will likely drive more gender diversity over time. For example, it used to be the case that only 5% of musicians in the top-five orchestras were women. Orchestras began doing auditions behind a curtain, where the judges could not see the candidate, and the number of women sharply rose to 25%. The blind audition has since become standard practice, and now women make up 50% of members.

The panel also suggested that there is a J curve to gender-diversity efforts, meaning that outcomes may get worse before they get better. (As part of her ongoing organizational research, Harvard Business School Professor Robin Ely asked businesses whether gender-diversity efforts would impede, improve or have no effect on the quality of the organization's work. Many

PANELISTS:

STEPHANIE NEWBY

Crimson Hexagon

LEENY OBERG

The Ritz-Carlton Hotel Company

respondents replied, "All three.") This is an important factor for organizations to understand: This J curve effect may make it difficult to win initial support and give ammunition to detractors in the early innings. But once companies have gotten through that initial period, gender diversity can offer self-reinforcing rewards; for example, there is ample evidence that women are more likely to seek more senior executive positions in organizations where there are already female role models at the top.

Based on the findings discussed during the session and found in literature elsewhere, it makes sense for investors to ask about and look for diversity on management teams and boards of directors. Stephanie Newby also suggested that asking about succession planning is important: If companies use a measured, thoughtful process for succession planning, it is another sign that they value a merit-based approach to advancement, an approach that, in time, should lead to more women rising to C-level positions within businesses.

—Emily Mathews

Equity Research Analyst



FROM LEFT: STEPHANIE NEWBY; LEENY OBERG; MODERATOR DUNE THORNE

The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies

Only 10 years ago, leading scientists believed that while machines will certainly evolve and improve, there would always be certain tasks that only humans could perform. Robots might replace workers on an assembly line, but drive a car? Impossible, said most scientists—at least not in the foreseeable future. And then, in 2010, Google announced its driverless car. So what's happened in our recent past to make things like the driverless car possible? And what are the implications? Those are the questions that MIT economist Andrew McAfee sought to answer in his NOW 2014 keynote address.

For one, Mr. McAfee pointed to the concept of Moore's Law as a driver of these advancements. If computing power and available digital data are indeed doubling every two years, then one can start to conceive of how, over the years, this exponential path

has progressed from small absolute gains to inconceivably large ones. In fact, Big Data is getting so big that we are on the verge of running out of metric prefixes to describe how much digital data is out there. We are now in the "Zettabyte" era—that's 10^{21} or 1,000,000,000,000,000,000,000 pieces of digital data in the world. The only metric prefix left is "Yotta" (10^{24})—when these prefixes were created in 1991, no one could comprehend a world where a larger measurement would be needed. But it won't take long before we need some new terms. Mr. McAfee assured us that a working group has been assembled to generate some candidates; "Hella" is a frontrunner.

So now that these unthinkable technological advancements are here, what does it mean for those of us investing or running a business? Mr. McAfee was confident in his assertion that disruption is coming, if not already here, across nearly all business arenas. His simple message to businesses is to embrace "geeks," "machines" and "outsiders."

"Geeks" (Mr. McAfee stressed that this is a term of endearment) driven by data will play an increasingly important role in business decision-making. The realm of professional sports is a wonderful example of this phenomenon; coaches and managers once relied on gut instinct, but today most key decisions are backed up by reams of statistics and scientifically dissected game film that is only possible thanks to technological innovation.

SPEAKER:

ANDREW MCAFEE *Principal Research Scientist, Center for Digital Business, MIT Sloan School of Management*

"Machines" offer us a straightforward path to success: They're coming, so use them. Plug IBM's Watson into Apple's Siri and call centers become automated. Google's driverless cars, eventually, will take the place of long-haul truckers. Businesses should embrace these disruptive technologies and find ways to deploy them in creative business models.

As for "outsiders," Mr. McAfee pointed to a recent Merck-sponsored contest to illustrate his point. Merck offered a cash prize to anyone who could find molecules that might lead to new drugs. The winners were not biologists or chemists, but a group of computer scientists who designed an algorithm to identify their winning entry. But they had no specific knowledge about how molecules actually bind to targets within the body. His point was that those who deal in data, regardless of the field, will be of huge value to companies in a variety of areas. Companies need to welcome these outsiders and the data-driven analysis that they bring.

On the whole, Mr. McAfee foresees many benefits coming from the changes we are seeing. As business executives and investors, we must accept that rapid technological advance is part of the new normal—and to thrive going forward, we must welcome it.

—*Ryland Sumner*

Co-Head of Private Equity



ANDREW MCAFEE

Fostering the Next Generation of Innovation

This discussion of methods that can encourage the next generation of innovators benefited from a diverse panel that included a venture capitalist, the head of an incubator, a brand consultant and the CEO of an enterprise mobile platform. The panelists shared their thoughts and insights regarding the transition toward global innovation, headwinds and tailwinds influencing the millennial generation, and important qualities for entrepreneurs.

“INNOVATION COMES FROM EVERYWHERE”

~ Susan Amat, Ph.D.

For the most part, Americans think of Silicon Valley as the epicenter of innovation, and there are plenty of media stories about whether Austin, Boston, New York or some other city will step up as the next Silicon Valley. However, both David Blumberg, whose seed-stage firm invests in Israel and Germany in addition to the U.S., and Susan Amat, whose incubator has worked with entrepreneurs from more than 25 countries, provided a different perspective about the innovation taking place overseas in developed and emerging markets.

“CENTRALIZATION IS THE ENEMY OF INNOVATION”

~ David Blumberg

The panel believes that the millennial generation is more likely to innovate than previous generations, due to continuous evolution of technology, better access to



FROM LEFT: MODERATOR TIM HATHAWAY, JOE GRACEFFA; SUSAN AMAT, PH.D.; JESUS RODRIGUEZ, PH.D.; DAVID BLUMBERG

capital and, importantly, the relatively low cost of creating a business in today's easy-to-outsource world. Interestingly, Mr. Blumberg noted that millennials are generally somewhat skeptical of mainstream institutions, and this factor is driving a new wave of businesses that capitalize on crowdsourcing and the sharing economy to disrupt those institutions. Whether it's Uber disrupting the taxi industry or Airbnb taking on hotels, we have seen this trend play out a number of times, and the panel expects that these disruptive ideas will continue to spawn outside of traditional entrepreneurial channels.

“LET'S FAIL, BUT FAIL FAST”

~ Jesus Rodriguez, Ph.D.

“FAIL OFTEN AND FAIL EARLY”

~ Joe Graceffa

Interestingly, some of the more notable headwinds for entrepreneurs in the past (for example, the cost of starting a business, access to capital for funding, etc.) are considered tailwinds today.

PANELISTS:

SUSAN AMAT, PH.D. *Venture Hive*

DAVID BLUMBERG *Blumberg Capital*

JOE GRACEFFA *IDEO*

JESUS RODRIGUEZ, PH.D. *KidoZen*

Instead, the panel spoke to a surprising fear of failure as perhaps the biggest challenge to millennial innovation. Dr. Amat noted that millennials often care less about learning than they do about the grade they receive, and that is perhaps understandable given how early competition begins for children in today's school, athletic and social environments. Much of the session's discussion revolved around how to overcome this fear—how to encourage grandiose thinking from a young age and how to inculcate the value of persistence. While there is no magic solution here, the panel strongly encouraged the development of programs to support adolescents with entrepreneurial tendencies. Parents can also make a difference by helping children experiment with creative business ventures. Such investments by parents are unlikely to turn a monetary profit, but they can offer invaluable experience for children—even if the only lesson is that failure is not the end of the world.

—Keith T.P. Stone

Private Equity Analyst

What Is America Thinking?

"If you liked the last three years, you'll like the next three." So said legendary political prognosticator Charlie Cook in his breakfast remarks to open Brown Advisory's 2014 Navigating Our World conference. The 7:30 a.m. start time did nothing to thin a crowd that was eager to hear Mr. Cook's insights, and those in attendance were treated to a mix of current facts and figures as well as an entertaining review of American history. All of it, as he regretfully reported to us, supports his somewhat fatalistic outlook—he believes that the political climate and the electoral numbers in the next few elections strongly suggest a continuation of the see-saw pattern of frequent power shifts that has held sway in recent U.S. elections, with no clear end in sight to this era of government paralysis.

In a quick look back at history, Mr. Cook noted that the Founding Fathers designed the House of Representatives, with its short two-year terms, to be responsive to the electorate's "hot" feelings, while the Senate was meant to be a slow and deliberate chamber with low turnover (even lower at first, when its members were elected by state legislatures as opposed to citizens). Current conditions, however, have turned this plan on its head, and Mr. Cook saw a strong chance of status-quo results in the House for the near future, while he saw the Senate as far more likely to whipsaw back and forth between the parties.

He was relatively confident that the House Republicans will retain their majority, based on the highly favorable

conditions for incumbents in 2014: 93% of Republican incumbents are in districts that Mitt Romney won in the last presidential election, and 96% of Democratic incumbents are running in districts won by President Obama. Given that heat map, he found it highly unlikely that the Democrats can find the 17 seats they need to take the House majority.

**MR. COOK SEES
A CONTINUATION
OF THE SEE-SAW
PATTERN OF
FREQUENT POWER
SHIFTS THAT HAS
HELD SWAY IN RECENT
U.S. ELECTIONS.**

However, he felt that the Senate was ripe for change. He noted that Democrats in 2014 are facing a perfect storm of obstacles to retaining their Senate majority. Republicans only need six seats to win the majority, and 21 Democrats are up for re-election compared to only 15 Republicans. Six of those Democrats are in states where Romney won by more than 14%. Given these factors combined with general

SPEAKER:

CHARLIE COOK *Editor and Publisher,
The Cook Political Report*



election demographics (Mr. Cook noted that midterm voters tend to be older, whiter and more conservative), his bet was on the Republicans to take the Senate. However, the 2016 Senate race will be in a presidential election year (which typically produces higher turnout of younger, more diverse voters), and Republicans will be defending 24 of 34 open Senate seats, offering the Democrats another prime opportunity to take back power. And in 2018, it will be another conservative-leaning midterm election with 25 currently Democratic seats up for grabs compared to eight Republican seats, and so it will go.

With all of these dynamics in place, plus one of the most combative political environments that Mr. Cook has seen in his career, he warned that "anybody who is expecting Congress to become a functioning institution is going to be disappointed."

—Joshua R. Perry

Fixed Income Credit Analyst

Faith, Fundamentalism and Economic Growth

PANELISTS:

HAMID KADIALLAH, PH.D. *Wellcome Trust*

MARC LYNCH, PH.D. *George Washington University*

DALIA MOGAHED *Mogahed Consulting, LLC*

In its April 19, 2014 edition, *The Economist* noted (and disagreed with) the notion held by some that the Middle East might have been better off without the Arab Spring. To be sure, the tragic situation in Syria, the failures of Egypt's fledgling democracy and many other setbacks have cast a significant pall over the region's optimism of a few years ago. However, investors have not suffered alongside the citizens in these countries. Consider Egypt: The Dow Jones Egypt Stock Index rose more than 50% from the end of August 2013 through the end of April, amid a military takeover, reprisals against the Muslim Brotherhood and generally chaotic conditions.

Our expert panel discussed this seeming dichotomy during a lively morning session. Dalia Mogahed and Marc Lynch, leading experts in the field of Middle Eastern studies, each presented a similar regional assessment. The short-term results of the Arab Spring have been "apocalyptic," in Dr. Lynch's words, and reports of the demise of authoritarianism in the region were clearly premature. (We should note that Dr. Lynch mixed a

strong cautionary note with his optimism when speaking at our NOW 2012 conference.) But over a longer-term horizon, change and progress seem inevitable. Deep income inequality, corruption and the inability of governments to provide basic services have brought many populations to the breaking point. Importantly, control of information is now impossible. The panel noted that even in restrictive Saudi Arabia, protest videos are now regularly posted on YouTube that get upwards of 5 million views within an hour. And although the initial tide of the Arab Spring has ebbed, the broad population is now deeply politicized and highly mobilized in a way that it has never been previously, greatly increasing the likelihood that citizens in the region will continue to grasp for freedom.

Meanwhile, Hamid Kadiallah of Wellcome Trust has invested in the Middle East and North Africa (MENA) region for many years and shared his perspective on the strong recent returns that some MENA markets have generated. Like his fellow panelists, he took a longer-term view. For example, he downplayed the Egyptian market's recent

run and noted that while the investment community appears to have viewed the military's recapture of power from the Muslim Brotherhood as an improvement, in the long run few questions have been answered about building a functioning, self-sufficient economic system. He sees healthy growth opportunity in the more well-developed and diversified MENA economies such as the UAE, Qatar and Turkey (although he is wary of the potential consequences of Turkish Prime Minister Tayyip Erdogan attempting to extend his rule too long), but both he and the other panelists believe that a "predictable unpredictability" has come to the entire region, increasing the political risks even in previously safe-haven countries such as Kuwait.

We continually scan the globe in search of the next wave of emerging-market growth opportunities and believe that frontier markets such as the Middle East and Africa are likely to produce some of those long-term opportunities. Unsurprisingly, these markets carry a high level of uncertainty, in both directions—from negatives such as sovereignty risks and ripe conditions for terrorism, to amazing and hopeful positive signs such as the blossoming of women's education (in many countries, women now outnumber men in college) and surging local entrepreneurial activity. Our panel helped us to confirm both the considerable potential in the region as well as the need for a high level of selectivity and a patient, long-term approach.

—Ethan Berkwits
Market Analyst



FROM LEFT: HAMID KADIALLAH, PH.D.; MARC LYNCH, PH.D.; DALIA MOGAHED; MODERATOR ERIC GORDON

Forces of Disruption

At the age of 34, Vivek Kundra was appointed by President Obama as the first-ever chief information officer of the United States. On his first day on the job, as he related to us during his lunchtime keynote address at NOW, he was greeted with a thick stack of reports representing \$27 billion worth of federal-government projects behind schedule. Where others may have seen the job of cutting through that stack as an insurmountable task, he saw an opportunity to disrupt an antiquated process and drastically cut waste. Within six months, his team had implemented a “Cloud First” approach to managing government data, allowing them to shutter 40% of the government’s 2,090 data centers and cut \$3 billion in spending—all achieved, he



VIVEK KUNDRA

said, by “shining a bright light on how each taxpayer dollar was being spent.” Along with Mr. Kundra being one of the youngest presidential appointees, his disruption of the status quo soon made him one of President Obama’s least-popular appointees among members of Congress.

Mr. Kundra offered an optimistic vision of a future powered and disrupted by the powerful sets of data that are just now being unlocked by the U.S. government and unleashed by private enterprise. Before he began working with the Obama administration, the government had twice published major proprietary data sets for public consumption—satellite-derived positioning data from the Global Positioning System (GPS), and the findings of the Human Genome Project. Both sets of data have enabled multiple waves of private-sector innovation that are still being felt today. For example, Google Maps changed the way that we find our way to new places, and more recently the startup Uber has very quickly upended the entire business model of the taxi industry). Mr. Kundra believes that this intersection of public data and private enterprise can produce massive growth opportunities, and this conviction drove him to spearhead the “data.gov” project, essentially a single central website that serves as a repository for 250,000 distinct data sets representing all government data that is not restricted for national security reasons. Taken in many cases out of

SPEAKER:

VIVEK KUNDRA *EVP, Industries, Salesforce.com; former Chief Information Officer of the United States*

dusty file cabinets in forgotten storage units, this data is now accessible to entrepreneurs, reporters, scientists and students in every corner of the globe, in effect lowering the barriers of entry for creative thinking and smashing geographic constraints. This is the disruptive force of an open and transparent data cloud, and he believes that it will eventually shake every industry to the core. He highlighted a number of startups, such as Nest with its Internet-connected, data-enabled thermostats, and LendingTree with its innovative lending exchange that matches borrowers and lenders, but feels that these represent only the vanguard of this coming revolution.

In 2012, Mr. Kundra stepped down from his government role and joined salesforce.com, a company whose hard-charging style and transformational open-cloud technology have enabled its rapid growth and gains in market share from entrenched firms such as Oracle and SAP in recent years. For the company to continue taking market share, it must continually reinvent itself, and one of its key principles is its refusal to rely on legacy technologies and processes. The firm believes that its commitment to continuous innovation is what separates it from its peers and helps it to attract the industry’s top talent, and Mr. Kundra would argue that the same principle holds true for the governments of the world.

—Galen Carroll,
Portfolio Analyst

3D Printing: Parsing Reality from Hype

Although the industry has been around for more than 25 years, only recently has a mainstream audience started to focus on 3D printing as a potentially disruptive technology. As discussed in our session at NOW, 3D printing still has significant limitations, but the technology is getting closer to the point where it could transform manufacturing in multiple industry segments.

There are numerous advantages that 3D printing offers over conventional manufacturing. One advantage is customization: The technology allows users to fully tailor products to specific end-user needs, which is particularly relevant for any business focused on medical implants and devices that fit in the human body. Another advantage is speed: 3D printing during the design stage can dramatically reduce development cycle times and therefore help companies get to market more quickly. Finally, 3D printing offers the potential for actual advances in what we can build: 3D printers give users the ability to design and build objects that are not otherwise physically possible to create using traditional manufacturing. This is leading designers to change how they design products, and this path may lead to products that don't just benefit from 3D printing—they require it.

3D printing is already finding its way into current industrial and commercial applications. For example, Michael Weinberg explained that mobile-phone antennas used to be manufactured



FROM LEFT: MODERATOR SIMON PATERSON, TODD RAMSBURG; MICHAEL WEINBERG; KEGAN SCHOUWENBURG

in one specific shape by traditional machining techniques, but 3D printing now allows antennas to be customized to meet sensitivity and size specifications. The result is that designers are going beyond the limitations of the past and stretching their imaginations to better align product design with desired functionality. Kegan Schouwenburg's company SOLS Systems prints custom orthotic inserts that are more accurate, more comfortable and of higher quality than machine-made counterparts. With a traditional manufacturing solution, customers typically wait two to four weeks after a fitting to receive their inserts. SOLS can turn orders around in less than 24 hours.

As is often the case with emerging technologies, increased media attention has created hype around 3D printing. In particular, the press has touted how easy it is for mass-market consumers to use these machines. But for higher-end industrial applications, the software and material requirements are quite

complex, so no one should expect a one-button solution for creating objects from scratch. The technology also quickly runs up against fundamental roadblocks: For example, 3D printers are still only capable of using one type of material per object, and obviously many consumer products are made of multiple materials. Material science still needs to evolve.

From an investment standpoint, the panel cautioned investors to be wary of companies overly exposed to the consumer market given the intensity of competition. But over the long term, they see significant potential for applying the technology in a broad array of settings. 3D printing has the potential to shrink traditional supply chains and disintermediate companies that sit between customers and manufacturers, and in doing so upset the natural order in a number of industries.

—David Powell

Portfolio Manager

Imagining the Future: A Contrarian Thesis

Today's venture capital market and the news coverage surrounding it seem dominated by social media businesses and their suitors, as evidenced by the multibillion-dollar valuations of companies like Snapchat and WhatsApp. It is comforting to know that some venture investors are not getting entangled in the hype. In his address at NOW, Josh Wolfe of Lux Capital demonstrated how he is making a living by breaking away from the herd.

Where should one look for contrarian investment ideas? One valuable source may be science fiction, where great writers have repeatedly developed concepts that became commercial reality decades later. Mr. Wolfe noted that technological progress is enabling more and more of these examples. Apple's voice "companion" app Siri was first envisioned as HAL 9000 in Arthur C. Clarke's *2001: A Space Odyssey*. The scene in which Luke Skywalker's hand was replaced by a robotic surgeon in *The Empire Strikes Back*? That concept is now closer to reality thanks to innovations like Intuitive Surgical's da Vinci Surgical System and the new surgical robots being developed by Auris, a Lux portfolio company.

While science fiction may aid us with idea generation, more grounded philosophies are required as well to guide investments. One of the most influential philosophies guiding the team at Lux is Moore's Law, the theory originally proposed by Intel co-founder Gordon Moore that suggested that semiconductor technology would advance at

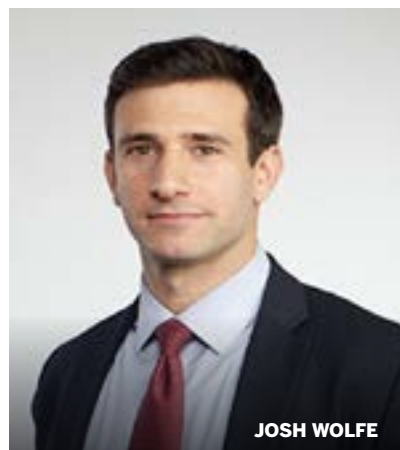
an exponential pace. Mr. Wolfe and his team apply this concept to many industries to understand the potential opportunities generated by things becoming faster, stronger, smaller or more powerful.

Recently, Lux applied this framework to the overlooked field of energy density. Throughout history, energy inputs have evolved from carbohydrates (fields and forests) to hydrocarbons (coal and natural gas), and more recently to uranium, which delivers the highest density per unit of any raw material. In theory, nuclear should be the energy technology of choice for everyone due to its density and efficiency, but in practice nuclear waste has offset much of the energy source's potential economic advantages in the form of massive environmental and public health consequences. These issues have real financial meaning for the industry's progress, as evidenced by how difficult it is to win approval for new nuclear plants in the U.S. Seeing opportunity in addressing the industry's greatest shortcoming, Lux created a new business called Kurion (named after Marie Curie, who discovered radiation) to focus on nuclear remediation, and the company created an incredible device that removes 99% of the radioactive properties from nuclear waste. Just months after the removal system was created, Kurion was awarded one of five 10-year contracts to participate in the relief efforts in Fukushima, and Mr. Wolfe noted that the firm's annual revenues have leapt more than a hundredfold since 2011.

SPEAKER:

JOSH WOLFE

Managing Partner, Lux Capital



In Mr. Wolfe's view, humans have shown themselves to be inherently poor at predicting future successes. The entrepreneurial landscape is littered with inventions like the Baby Duster, Noodle Cooler and Hay Fever Hat (all real products—look them up!). However, a key mantra for Lux is "the best way to predict the future is to invent it," or at least identify people who can. This notion also guides our private equity efforts at Brown Advisory, where we attempt to stay ahead of the pack by identifying thought leaders at firms such as Lux Capital or The Founders Fund, a venture capital firm created by the former founding members of PayPal to invest in "change the world" technologies. As it relates to impactful venture investing, we believe that those who go out on the limb get the fruit.

—JJ Baylin

Private Equity Analyst

Driving Sustainable Profits in a Resource-Constrained World

In her introduction, moderator Karina Funk noted that if you enjoy clean hospitals, safe food or cloud technology, you are a fan of sustainability, even if you don't use that term. Global demand is growing rapidly for both basic need fulfillment and higher-end creature comforts. Corporations need to deliver products and services efficiently, even as they confront constraints on available resources such as energy, water, various material inputs and the infrastructure needed to deliver their offerings. Companies that can overcome these restraints today can put themselves in a good position to succeed in the future.

The panelists each spearhead sustainability efforts at their respective companies, and they discussed how their efforts are driving shareholder value. Accenture's Robert McNamara spoke of his firm's work with some of the world's largest companies to develop long-range business strategies rooted in sustainability. Mr. McNamara helped to produce a report last year with the United Nations that surveyed more than 1,000 CEOs on sustainability issues. Only 32% of respondents felt that the economy was on track to serve the demands of the world's population, and 76% believe that embedding sustainability in their firms' strategies can drive growth. These two facts suggest a major shift in thinking for the typical CEO.

Kathrin Winkler of information-storage leader EMC said that in her experience, a handful of one-off sustainability initiatives rarely help a company make progress. What is often needed is a new lens that management can use to upgrade their overall business



FROM LEFT: MODERATOR KARINA FUNK; EMILIO TENUTA; ROBERT MCNAMARA; KATHRIN WINKLER; STEPHEN KEHOE

approach. Ms. Winkler pointed out that EMC's CEO and CFO are fully involved in sustainability efforts and have learned how it really matters to EMC's bottom line. As an example, the firm had identified risks in its supply chain in Southeast Asia from weather-related disasters and built redundant suppliers into its system as a result. When heavy flooding in Thailand temporarily swamped that country's electronics suppliers, many global semiconductor firms saw interruptions in supplies while EMC was in much better shape.

Stephen Kehoe of Visa spoke about sustainability through the lens of regulation, particularly in emerging markets where Visa has a huge business opportunity due to the rapid proliferation of mobile devices. Its payment network already provides a financial transaction backbone for a good portion of the 2.5 billion emerging-market consumers who have no access to traditional banks or institutions. This is also an opportunity to lift people out of poverty, empower women and enable economic growth by offering high-quality, low-cost access to financial services. Visa engages early and often in policy discussions in emerging nations, where in

many cases financial regulation is in an embryonic stage or at a crossroads.

Finally, Emilio Tenuta of Ecolab offered suggestions for getting traction in the CFO's office. In many ways, the simplest definition of sustainability is risk management, and one way to highlight the business case for sustainability is to quantify risk. For example, water scarcity is a real risk factor for Ecolab and perhaps more so for many of its customers. By highlighting the potential financial impacts of a water shortage in various countries, Mr. Tenuta has gained support for initiatives that conserve water usage.

As the session closed, the panelists were asked if chief sustainability officers are on track to win CEO posts in the future. They all agreed that a tour in a sustainability position would likely be increasingly important for CEO candidates in the future. Mr. Kehoe offered a refreshing answer that summed up the strengthening link between strategy and sustainability: If someone can help a company to win 2.5 billion new customers, hopefully that makes them a reasonable candidate.

—Nigel Frankson
Equity Research Analyst

The Path to Long-Term Sustainable Growth in China

China is choking. After four decades of coal-powered growth, air quality in many cities has reached intolerable levels. During Beijing's "Airmageddon" last year, air particulates at times reached 40 times maximum safety limits. Water quality is becoming an even larger problem. Witness the horrible images that went viral last year of 16,000 dead pigs floating in tributaries of the Huangpu River that feeds Beijing. The World Bank has estimated that environmental degradation in China may be reducing gross national income by as much as 10% annually, a fact not lost on the government, corporations and citizens of China.

It may be surprising to hear that The Nature Conservancy (TNC), an organization known primarily for its private land preservation work, is having a significant impact on Chinese environmental policy. But that's exactly what we learned at our NOW session featuring Shuang Zhang, who spearheads TNC's efforts in China. In a short period of

time—TNC began its program in China in 1998—the group's Chinese presence has grown to more than 70 staffers in five offices and is 100% funded by local Chinese supporters while also supporting work in other neighboring countries.

Perhaps the largest environmental problem that TNC has addressed in China is helping to protect the Yangtze River from unfettered damming activity to develop hydroelectric power. A huge portion of the country's population depends on the river, and one-third of China's GDP is produced within its watershed. The massive Three Gorges Dam project already sits astride the river and is creating considerable environmental problems, but more concerning was the government's plan to develop 40,000 hydroelectric dams along the Yangtze's 3,000-mile length. Such a plan would have been disastrous for the river's extended ecosystem. In response, TNC developed a better approach with the government that involved: fewer, larger projects as

SPEAKER:

SHUANG ZHANG *China Program
Direction, The Nature Conservancy*

opposed to the myriad of smaller ones; better siting to find areas where dams would have less impact; and better dam designs that used bigger, more efficient turbines and safer runoff. Over the past three years, the Three Gorges Co. has adopted these recommendations, and there is already substantial evidence of positive impact in the lower reaches of the river.

Mr. Zhang revealed that the key to TNC's success in China has been finding common ground—"win-win" approaches that benefit both the environment and the state. He told an anecdote of a painful learning moment, when he asked a local government official why he did not simply shut down a company that was polluting a populated area, to which the official replied confusedly, "Shuang, they give our region 600,000 jobs. People need to eat." This lesson guided TNC's work with Three Gorges, during which TNC repeatedly pitched recommendations by showing how each proposal would help cut costs and improve the bottom line. This approach mirrors the way that we think about sustainable investing at Brown Advisory. As investors, we are only tangentially interested in polarized environmental debate. Instead, we are entirely focused on looking for companies with business models that enhance returns through smart environmental strategies. We agree with TNC that such an approach can produce rewards for investors, companies and citizens alike.

—*Ethan Berkwits*
Market Analyst



THREE GORGES DAM AT YANGTZE RIVER IN CHINA

Investing in Africa's Emerging Consumer Class

When people think about Africa, they may envision lush landscapes, mysterious uncharted lands or heartbreaking circumstances. But few people think of Africa as a land of investment opportunities akin to South Asia or other emerging areas of the globe. Nonetheless, some analysts have boldly stated that the 21st century will be remembered as the African century—with the possibility of seeing Africa rise as an economic and investment powerhouse. Peter Mallinson, chairman of Brown Advisory Ltd., led an engaging discussion of the investment potential and risks of investing in Africa, as well as the pros and cons of public vs. private investing.

Africa's emergence as a growth engine has largely flown under the investing public's radar in recent years, but according to the World Bank, Africa is one of the few places in the world expected to grow more rapidly in the future (6% over the next decade) than it did in the past (4.5% since 1995). The World Bank reports that Africa's population of 1.1 billion is expected to double by 2050, and that half of its population is under 20. That demographic outlook seems quite attractive relative to China, for example, where rapid economic growth is expected to run afoul of an aging, slower-growth population.

Our panelists emphasized that Africa's popular image as a land of intense violence, poverty and famine may be accurate in some areas, such as South Sudan, DR Congo or Zimbabwe, but does not represent the whole picture. The continent's more advanced countries such as South Africa, Morocco and Tunisia are already



FROM LEFT: HERTA VON STIEGEL; KOFI ADJEPONG-BOATENG; GLORIA MAMBA; MODERATOR PETER MALLINSON

diversified, with growing consumer classes and healthy ties to the global economy that are fueling growth in both domestic industries and exports. The panel sees this sort of growth in its earlier stages throughout the continent. Two notable growth opportunities are in telecom and banking, and the intersection of these two sectors is being enabled by the widespread mass adoption of mobile phones in Africa, where the total subscriber base is approaching 500 million after a decade of rapid growth, and every user now carries a potential terminal for a wide array of financial transactions.

The heart of the investment story lies in the rising middle class, who are ready to access consumer goods. According to McKinsey, by 2010 Africa already had more middle-class families (defined as those with annual income greater than \$20,000) than India, and many observers believe that middle-class growth in Africa is likely to accelerate further. However, many widely held public companies listed on African exchanges such as BHP Billiton and SAB/Miller don't offer meaningful exposure to African consumers. Therefore, the panelists all noted that private investments are often the best and sometimes the

only avenue to truly capture emerging African growth stories, even when it comes to capital-intensive opportunities in telecommunications, power or waste management.

However, these opportunities do not come without risk. Seven of the top 10 countries on *The Economist's* 2010 Political Instability Index were in Africa. Corruption is still a meaningful presence that threatens progress, although panelist Kofi Adjepong-Boateng noted that both legitimate and corrupt investment opportunities have coexisted for years in many African countries. While infrastructure is certainly an opportunity that all three panelists find attractive, that infrastructure is still under construction today, particularly on the financial front. That creates notable risk for businesses and investors. Overall, investing in Africa remains a challenging endeavor—both the long-term prospects and the risks are real, and the need to invest privately to access many segments adds additional layers of complexity. But patient investors may still find compelling long-term opportunities given the continent's rapid growth.

—Taylor Graff

Asset Allocation Analyst

From Computing to the Clinic: How Big Data Is Transforming Medicine

The numbers are staggering: A combined 54 gigabytes of electronic records and medical imaging data are accumulated each day—and this only accounts for patient visits at the Johns Hopkins medical institutions. Multiply that number across thousands of other hospitals, medical offices and diagnostic facilities, sprinkle in the massive amounts of data collected by health insurers and medical manufacturers, and you can begin to see the magnitude of the information being collected by the health care industry.

As noted by Dr. Winslow, much of this information has not yet been properly explored, and the embryonic effort to wrangle all of this data and use it to improve outcomes and drive down costs offers incredible opportunities. Advances in computing power coupled with plummeting data-storage costs now allow us to collect, integrate and analyze data, and let us tackle questions

whose answers were previously out of reach.

But even with the latest technology, we have fundamental challenges in teaching our computer models to learn and make sense of all of this information. Limited sample sizes and other statistical limitations make learning difficult, as do broad gaps and inconsistencies in collected data. Without common standards across databases, we are limited in what analyses we can ask computer models to perform. The data itself may also suffer from bias and noise—ranging from simple coding errors to the fact that different providers often produce different diagnoses from the same symptoms. Further still, security and privacy are still major factors that make institutions reluctant to share data.

There are, however, early success stories that show the value of data-driven health care. In a 2004 study, Kaiser Permanente was able to mine data across its massive client list to

SPEAKER:

RAIMOND WINSLOW, PH.D.

*Director, Johns Hopkins Institute
for Computational Medicine*

find that those taking the pain-reliever Vioxx were more likely to suffer from a heart attack than those taking rival drugs. This obviously had a tremendous impact on Vioxx sales and Merck stock, but it also raised fundamental questions about the clinical-review process and broader thoughts on safety. In another example, a 2009 study by pharmacy-benefits manager Medco found that up to 30% of its population that was taking the anti-clotting drug Plavix had genetic variations that prevented them from metabolizing it. In other words, close to one-third of Medco's customers on Plavix were getting a drug that had no chance to be effective.

We're also seeing advances in physical imagery, where real-time data allows for better placement of therapies. For example, we can now model the exact shape of a patient's hippocampus, and that shape becomes an anatomical biomarker for dementia and Alzheimer's.

Big data is here, and we certainly have the computing power to enable clinical decisions. There have been early success stories, but we still have plenty of challenges ahead to properly exploit this wealth of data.

—Sung Park

Equity Research Analyst



War, Peace, and the Future of Governance

PANELISTS:

PETER BERGEN, ROSA BROOKS, SASCHA MEINRATH, THOMAS RICKS AND ANNE-MARIE SLAUGHTER

New America Foundation

Moderator Anne-Marie Slaughter began this NOW session by proposing an alternate potential title: “When War Became Everything and Everything Became War.” Indeed, the topic of the day was how blurred the definition of war has become. War once meant the commitment of soldiers—not so in the drone era. War once meant the use of weapons, physical casualties and deaths—not so when a cyberattack can do more damage than any battlefield maneuver.

The panel touched on several ways war is evolving. Unmanned drones grow more important and are deployed in a wider range of scenarios every year, and they may soon become the primary weapon of the U.S. in armed conflicts. Tom Ricks suggested that this will render the Air Force at least partially obsolete, at least in terms of its mission to fly manned aircraft into combat zones. But with the use of drones comes many questions. What happens when other countries use drones against internal dissidents? Peter Bergen also pointed out that if drone fleets become our primary fighting force and enable us to drastically reduce ground-troop deployments, it would change the politics of war. The populations of the U.S. and other countries might be more willing to use force if soldiers weren't immediately in harm's way, even if collateral damage in civilian areas might be just as much of a threat.

Regarding cybersecurity, Sascha Meinrath pointed out that as more devices become connected, the attack vectors increase. What if all of our

thermostats were connected to the Internet? Could a cyber attacker effectively lay siege to the U.S. by cranking up the heat on a July afternoon? (These questions were also raised at the “Cybersecurity: Just an Illusion?” panel during the conference.) Georgetown Law Professor Rosa Brooks pointed out that this kind of question blurs the lines as to what constitutes an “act of war.” What if the hack on Target's network and subsequent theft of millions of credit card numbers had been perpetrated by a specific nation-state? Would we consider that an act of war? Ms. Brooks sees this as an emerging quagmire that may drive an increasing amount of legal and political friction.

The panel also discussed how military infrastructure may need to change in the future. Mr. Ricks noted that the military is “very good at bending metal and bending the will of Congress,” which has kept up inertia on the production of large weapons systems that are becoming increasingly obsolete. Meanwhile, Ms. Brooks pointed out that the military still looks for recruits not employees, and the implied lifelong commitment is a big deterrent

to many talented young people. Mr. Ricks recalled a time when the private sector clamored to hire West Point's engineers, but today Silicon Valley isn't hiring West Point grads, adding (somewhat provocatively), “How much do we need Patton in today's world, and how much do we need Steve Jobs?”

There are some relatively visible investment implications of recent changes in warfare—the trend favors cybersecurity firms but not defense contractors, for example. More importantly, these changes in the nature of war threaten to decrease geopolitical stability over the long term, which could lead to higher market volatility. Based on what we see today, we may be entering an era when war is less about big conflicts and more of a continuous simmering tension that plays out in less bloody but more frequent confrontations. We can't predict the specific implications of that scenario, but it seems clear that Ms. Slaughter's statement that “war has become everything” applies to the investment universe as well.

—Thomas D.D. Graff
Head of Fixed Income



FROM LEFT: MODERATOR ANNE-MARIE SLAUGHTER; PETER BERGEN; THOMAS RICKS; SASCHA MEINRATH; ROSA BROOKS

Unlocking the Mysteries of the Blood-Brain Barrier: The Frontier of Brain Science

SPEAKER:

PETER SEARSON, PH.D.

*Director, Johns Hopkins Institute for
NanoBioTechnology*

During this NOW session, Peter Searson shared with us the landscape for current research on the “blood-brain barrier,” the brain’s highly selective border patrol that prevents most chemicals and other substances from crossing from the bloodstream into the fluids of the brain and central nervous system. He also discussed the large opportunity for commercializing any breakthrough technologies that might emerge from the research community in the future.

Dr. Searson started by reviewing what we know about the blood-brain barrier, or BBB. He offered a simple example: If you inject a simple water-soluble dye into your circulatory system, and then examine yourself a few minutes later, you will find that dye spread throughout your body—but not your brain. The dye was blocked by the BBB, a barricade of endothelial cells that grants passage to small molecules like oxygen and carbon



dioxide but blocks almost everything else from getting through. Notable exceptions are alcohol, caffeine and some painkillers, but the barrier essentially stops all bacteria from entering the brain and nervous system, as well as most types of drugs. It also actively transports critical substances such as glucose and amino acids using selective proteins.

The BBB blocks nearly all small-molecule drugs and large-molecule neurotherapeutics. This fact is possibly the largest hurdle to treating many central nervous system (CNS) diseases as well as brain metastasis from primary tumors. Mental disorders, Alzheimer’s, Parkinson’s, stroke damage, migraine headaches—all of these prove highly difficult to treat due to the BBB. Only a few CNS disorders such as depression, schizophrenia and pain are currently treatable with small-molecule drug therapy. So clearly any advances in penetrating the BBB could hold the key to effectively treating a variety of serious

conditions—a potential bonanza for those suffering from these conditions as well as the companies that are able to commercialize those advancements.

Unfortunately, current research on the BBB is at an extremely early phase—there is a substantial amount of thoughtful work going into nanotechnology and other types of research, but the scientific community still knows relatively little about the BBB. In fact, it may turn out eventually that the current research approaches are entirely wrong for the task, and the solutions will be found along completely different paths. For the moment, we can only support primary research as scientists look to crack this extremely important code.

—Sheryl Zhou

Equity Research Analyst



PETER SEARSON, PH.D.

Cybersecurity: Just an Illusion?

This NOW session set out to answer the question “Cybersecurity: Just an Illusion?” Unfortunately, from the panelists’ perspectives, the answer is a resounding yes. The question is no longer whether you have been hacked. Our panelists believe that you have, whether you know it or not. A quick fix will be difficult to achieve as there are a number of structural weaknesses in our technology infrastructure that, for the time being, make true cybersecurity impossible.

As background, the Internet was originally set up to share data, not protect it. As a result, the Internet is permeable by design and uses common technology standards across platforms. This has created a technology monoculture akin to an agricultural monoculture, with similar weaknesses: The price of interoperability is that security vulnerabilities are often universal. For example, the wide-ranging damage of the recent “Heartbleed” bug would not have been possible without the broad adoption of the OpenSSL open-source security standard. Over time, the “Internet of things,” which promises to connect all electronic devices, will also greatly expand the scope of our vulnerabilities. By 2020, there will be 40 billion connected devices worldwide. Target was recently breached through a compromised HVAC system. As one of our panelists commented, we may eventually only be as secure as our refrigerator or coffee maker.

So how can we fix this? In Nate Fick’s view, the answer is not a silver bullet, but lots of lead bullets—meaning that it will not be solved in one fell swoop,



FROM LEFT: MODERATOR CHRIS BERRIER; WILL ACKERLY; ALLAN FRIEDMAN, PH.D.; NATE FICK

but by a number of new technologies and behavior modifications over time. Corporations, governments and other network operators, in the panel’s view, should change the focus from protecting networks to protecting the data inside the networks. Unfortunately, we have to assume that attackers are going to breach our networks at times. Our perimeter security and our adversaries’ intrusion technologies evolve too rapidly for us to always have the upper hand. But with a data-centric protection posture, we can focus on keeping data safe even in the presence of intruders, perhaps with new encryption technologies. The data, after all, is much more important than the network itself, in most cases. A data-centric protection regime could also facilitate broader data sharing, potentially increasing data applications and thus value.

On the consumer side, we need to harden ourselves against the random attack. We put our valuables in the trunk when we park the car, and we need to learn to do the same online. This means good password hygiene: We should all use varied passwords for accounts, change them periodically, and use

PANELISTS:

WILL ACKERLY *Virtru*

NATE FICK *Endgame*

ALLAN FRIEDMAN, PH.D.

George Washington University

two-factor authentication where possible. As new technologies like Virtru’s end-to-end email encryption solution become available, consumers should adopt them.

None of the suggestions above seem particularly out of reach, for institutions or consumers. So why are we having so much difficulty making progress on cybersecurity? A major factor is the fact that to truly implement a new security paradigm, we need to align and transform technology, policy and social behaviors. Unfortunately, our cultural attachment to privacy and the glacial pace of progress on cybersecurity policies are both significant roadblocks to the sort of “open-border,” data-centric security policy described above. If there is a hopeful takeaway from this panel, it is that smart people are focused on the problem and new protection tools are on the way, but we also need to acknowledge that technology is only part of the eventual solution.

—John Bond

Equity Research Analyst

OFFICE LOCATIONS

BALTIMORE

(410) 537-5400
(800) 645-3923

WASHINGTON

(240) 200-3300
(866) 838-6400

LONDON

+44 203-301-8130

NEW YORK

(212) 871-8550

BOSTON

(617) 717-6370

CHAPEL HILL, NC

(919) 913-3800

WILMINGTON, DE

(302) 351-7600

brownadvisory.com

brownadvisory@brownadvisory.com

The views expressed are those of the speakers, panelists, authors and Brown Advisory as of the date referenced and are subject to change at any time based on market or other conditions. These views are not intended to be a forecast of future events or a guarantee of future results. Past performance is not a guarantee of future performance. In addition, these views may not be relied upon as investment advice. The information provided in this material should not be considered a recommendation to buy or sell any of the securities mentioned. It should not be assumed that investments in such securities have been or will be profitable. To the extent specific securities are mentioned, they have been selected by the author on an objective basis to illustrate views expressed in the commentary and do not represent all of the securities purchased, sold or recommended for advisory clients or other clients. The information contained herein has been prepared from sources believed reliable but is not guaranteed by us as to its timeliness or accuracy, and is not a complete summary or statement of all available data. This piece is intended solely for our clients and prospective clients and is for informational purposes only. No responsibility can be taken for any loss arising from action taken or refrained from on the basis of this publication.