

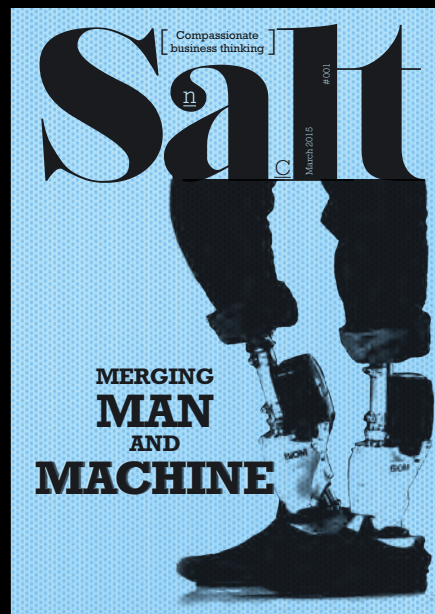
Compassionate  
business thinking

Salt

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MERGING  
MAN  
AND

MACHINE



COMPASSIONATE  
BUSINESS THINKING

March/April 2015

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**New economy:**

Handlesbanken: a different kind of bank

**Inspiring others:** Hugh Herr is merging man and machine

**Positive impact:** How changing your diet could help you save the planet

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# Salt

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March 2015 #001

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WELCOME TO THE FIRST EDITION OF  
A BOLD NEW MAGAZINE  
EXPLORING...

# Salt

## COMPASSIONATE BUSINESS THINKING

WE WHO HEARTILY BELIEVE IN A  
BETTER WORLD AND WE WANT TO  
INVITE YOU ON A JOURNEY WHERE  
WE CAN ENVIAGE TOGETHER  
WHAT THAT WORLD CAN LOOK LIKE.

TODAY THE WORLD IS AT A TURNING POINT. FEW DOUBT THAT WE FACE GREAT CHALLENGES EVERYWHERE. WE ARE CHALLENGED NOT JUST FROM RISING INEQUALITY, VOLATILE FINANCIAL MARKETS, AND POLITICAL SYSTEMS THAT HAVE STRUGGLED TO ADAPT TO OUR COMPLEX CHANGING NEEDS, BUT ALSO BY THREATS TO THE AIR WE BREATHE, THE WATER WE DRINK, THE FOOD WE EAT AND MORE WORRYINGLY THE ENVIRONMENTAL SYSTEMS THAT HAVE CONTRIVED TO SUSTAIN LIFE ON OUR PLANET SO ADMIRABLY FOR MILLIONS OF YEARS.

In the face of a barrage of seemingly never-ending negativity from the mainstream media, most people have been shocked into submission. Many of us suffer from a permanent state of low-level anxiety. Our politicians, for the most part, have given up despairing for us, and reverted, predictably, to type. There's a void of real leadership on the big issues.

Against this backdrop you could be forgiven for not wanting to get out of bed in the morning and for sticking your head in the sand. We wouldn't blame you. Yet the real story is that today there is also cause for hope. The scale of the challenges we face could spur us to greatness. In fact, many of the solutions needed to build a fairer healthier more sustainable economy already exist.

That is why we believe in humanity's ability to transcend the big issues we face to deliver real change. It's also why we felt the need for a magazine dedicated to transformative ideas and leadership, and constructive solutions based editorial.

A new generation of leaders is emerging, and they are people like you. They may be employees as much as they are CEOs, or maybe social entrepreneurs; perhaps they are innovators, or maybe just dreamers. It doesn't matter, what is important is that they are on the right side of history, and they want to see positive change.

We are all called to be leaders now. Together we can make miracles happen. We are proud to welcome you to SALT - a magazine for the change agents amongst us. We care deeply people and planet, and will always celebrate authentic leadership, and about those who are committed to making a difference. And we are all about...

[ **compassionate business thinking** ]



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**TONY BOSMA**  
FUTUROLOGIST



*How I would  
change the world...*

WESTERN SOCIETIES HAVE BECOME ADDICTED TO ECONOMIC GROWTH. ON A DAILY BASIS WE ARE FACED WITH ECONOMISTS, POLITICIANS AND EXPERTS TELLING US THAT THE HOLY GRAIL OF HUMAN PROGRESS IS ECONOMIC GROWTH. WE ARE URGED TO **KEEP CONSUMING** TOWARDS A 'BETTER' FUTURE. BUT THE PLANET'S RESOURCES ARE FINITE AND CONSTANT GROWTH WILL EVENTUALLY USE THEM UP. GLOBAL ECONOMIC GROWTH HAS QUADRUPLED SINCE 1970. THIS IS EXCELLENT NEWS FOR MANY OF US, BUT FOR THE MOST IMPORTANT ASPECT OF OUR LIVES - OUR PLANET THE NEWS ISN'T SO GOOD.

Unfortunately, there is more to come. Mainstream projections indicate that economic growth will quadruple again by 2050. Houston, we have a problem..... Despite living in a closed ecological system, we don't appear to be able to change our perspective on what humanity values the most. Together, we are heading at high speed in the wrong direction.

There's a growing feeling that we are subservient to systems and structures, instead of having them under our control. Slowly, but surely, we are realizing that our current lifestyles will soon be out of stock. A reset in the way we look at our economies, systems, organizations and institutions and how we measure growth and well-being is needed. But when will we see it happen?

Fortunately, there are reasons for

optimism. The urgency of our problems is making many people reevaluate what they thought was most important. One significant trend is to value sharing over possessing. Many of the new status symbols reflect how smart we are not to own stuff. We are becoming more aware of our dependence on the planet and starting to see that our current styles of life and economic systems are damaging it.

These emerging values need to be taken up by the business world. For governments and enterprises, success can no longer be defined as simply doing less damage. Organizations have to do only good. To achieve this, we need a fundamental change in the rules of business. What we have long believed to be normal practice has to be thrown out. All businesses have to change their ways. It's not enough for a few

businesses to be exceptions to the rules. A reset of our mindsets will enable us to take the fundamental first step of creating a much better world - one we can pass on with pride to our children.

You may call me naïve, or an idealist, but the truth is that I am a futurist. Contrary to popular conceptions, that doesn't necessarily mean I am driven to predict the future. Being a futurist is more about changing the mindsets of individuals within large and small organizations all around the world. I try to make them see the boundless opportunities that open up when we look at today's world differently. Don't we have to admit that we are facing a crisis of consciousness? Tenence McKenna put it beautifully: "It's clearly a crisis of two things: of consciousness and conditioning. We have the technological power, the engineering skills to save our planet, to cure disease, to feed the hungry, to end war. But we lack the intellectual vision, the ability to change our minds. We must decondition ourselves from 10,000 years of bad behavior."

I am happy if only a couple of people come to me after a session and say: "You have stretched my mind so I won't be continuing with my old ways of thinking. Let's make a difference." This is the first and most fundamental step towards creating a better world. As humanity, we are standing on the verge of a bridge which can only be crossed together.

**DR HAMIRA RIAZ**  
CLINICAL NEUROPSYCHOLOGIST



## What does **'being a man'** mean in the modern workplace?

There were signs that times were changing in the 1980s when an Arena poster of a male model cradling a baby sold out and became iconic in the blink of an eye. But it is perhaps the rise of the metrosexual movement that has most shaken things up for men. With David Beckham as its figurehead, the momentum has shown no signs of slowing over the 20 years since journalist Mark Simpson coined the term. Last year, Simpson wrote about the most recent incarnation of this type of groomed, buffed and coiffed man as a 'spornosexual'.

The benchmark set for men by celebrity spornosexuals is as dauntingly high as the standards supermodels have held women to for decades. Staying successful requires the relentless juggling of multiple competing demands. Add to this the mixed messages about what it means to be manly nowadays, and there is ample room for confusion and missteps.



This is not uniquely a 21st century phenomenon. This modern day dandyism carries echoes of the past. Indeed, peacock-like tendencies were a sign of being a successful man for most of the 18th century and beyond. And not only that, when Exeter University's Dr Alison Hagggett looked at masculinity through a historical lens, she found that heightened male emotionality was once viewed as a sign of belonging to higher social orders. During the Georgian period, in particular, mood swings, sleep disorders and a propensity toward introspection, were concomitants of being a wise and wealthy male. She suggests that the industrial revolution changed all that. Britain's need to assert itself as invulnerable on the global stage meant that the display of emotion began to be seen as a decidedly female trait. So, the ideal Victorian male reined in his emotions and became a model of reason.

[[ WHEN PEOPLE ARE REALLY HONEST ABOUT HOW THEY WANT THEIR LIVES TO BE, AND WHEN OUTDATED STEREOTYPES LIKE PROVIDER VERSUS NURTURER ARE NOT INVOKED, GENDER DIFFERENCES SIMPLY MELT AWAY ]]

THE JOHN WAYNE VERSION OF MASCULINITY, THAT OF A TOUGH, STRONG MAN WHO DOES GOOD WORKS BUT SHOWS LITTLE EMOTION, CONTINUES TO HAVE CURRENCY IN THE CORPORATE WORLD. BUT THIS ARCHETYPE OF MANLINESS IS UNDER SIEGE LIKE NEVER BEFORE, SAYS DR HAMIRA RIAZ, CLINICAL NEUROPSYCHOLOGIST AND BUSINESS CONSULTANT.

DR. Hamira Riaz

### High price

Men have been paying the mental health price ever since. The majority of suicides across the world are male. Suicide in men in their forties and fifties has risen 40% in 10 years. Alcohol abuse and major addiction problems are significantly more common in men. As is violent crime. Men seek help much less often than women. When they do, the way they present distress tends to be psychosomatic, that is, in the form of physical rather than psychological symptoms. It is probably that we greatly underestimate the prevalence of depression and anxiety disorders in men.

The bottom line is this. Men have not been well served by academic research, or medical institutions. The media has also been reticent about presenting men

such as provider versus nurturer are not invoked, gender differences simply melt away. Men and women are more alike than they are different in the way they describe a happy life. And to all of you who continue to maintain impermeable boundaries between how you come across at work and who you really are in private, I would ask this, to what extent can we hope to shift society's narrative about women in the workplace if we don't allow our expectations of men to change?

Men seek help much less often than women

as anything other than the 'dominant' sex. It seems that at least since the time when Freud turned his attention to the root cause of hysteria in women, the emotional lives of men have been left to take care of themselves. For a lot of men, talking about one's inner life still feels uncomfortable and in many ways remains taboo.

Wolters Kluwer's CEO, Nancy McKinstry, once said senior women are judged as "whole persons", not just on the company's performance, as their male counterparts are. I suggest there are encouraging signs this is changing, albeit too slowly. Success is in the process of being subtly redefined, both for men and women, such that it is broader, healthier and less gender-specific. And it's not before time because when people are honest about how they want their lives to be, and when outdated stereotypes



# MERGING MAN AND

THE REAL 'BIONIC MAN', HUGH HERR, IS NOT CONTENT WITH CREATING ARTIFICIAL LIMBS FOR THE DISABLED THAT SURPASS THE PERFORMANCE OF NATURAL LIMBS. HE WANTS TO SPARK A REVOLUTION BY ALLOWING EVERYONE TO USE THEM.

[ By David W. Smith ]

[[ ONCE YOU HAVE A BIONIC LIMB WHICH HAS A HIGH LEVEL OF FUNCTION, IT BECOMES COOL AND SEXY EVEN IF IT DOESN'T LOOK LIKE A HUMAN SHAPE. ]]

[ Hugh Herr, Bionic man ]

# MACHINE



**B**iophysicist Hugh Herr is creating a future in which robotic limbs for amputees are as intoxicatingly cool and sexy as fast cars and the able-bodied strap on bionic devices to run to work at 60mph. The Head of the Biomechatronics Research Group at the MIT Media Lab, Herr has devoted his life to designing devices which allow amputees to live normal lives free of stigma and shame. Through his company, BiOM, he has fitted bionic ankle-foots to around 1,000 people, 400 of them injured soldiers.

The ultimate goal of surpassing human functionality is close to the heart of a man who became a double amputee 32 years ago after a teenage climbing accident. Herr's first attempts were designed to get him climbing again, but he is now close to producing bionic limbs that anyone could wear, with profound consequences for human mobility.

"We've just had an important landmark in my lab," he said. "We've built a robotic structure that attaches to the human leg. We've augmented normal human walking

# DAWN OF THE BIONIC AGE

BIONIC LIMBS HAVE BECOME INCREASINGLY IMPRESSIVE OVER THE PAST DECADE, AND 2014 HAS SEEN SOME OF THE MOST EXCITING ADVANCEMENTS YET. RECENT DEVELOPMENTS INCLUDE BIONIC HANDS WHICH PROVIDE A SOPHISTICATED SENSE OF TOUCH, AS WELL AS ONES PRODUCED USING 3D PRINTERS.

**US** scientists have achieved some of the most remarkable results at Case Western Reserve University, in Ohio. Two of their 'bionic' patients now have the capacity to pluck stalks out of cherries. Such is their sense of touch that they can feel textures such as Velcro and sandpaper whilst blindfolded.

The Case Western researchers attach sensors to the bionic hands and fit "cuffs" around the remaining nerves in surgery. Signals are sent from a computer to the cuffs which deliver electronic stimulation to the nerves. The brain interprets these as different sensations which the team maps to 19 different locations on the hand from the palm to the tip of the thumb. The sensors are matched to the different electronic patterns of stimulation.

Meanwhile, scientists at the Chalmers University of Technology, in Sweden have created a mind-controlled prosthetic limb by attaching the artificial arm directly to the skeleton. This creates greater stability and a more intimate union between body and machine.

In the UK, an engineer in Bristol is using 3D printers to create bionic hands for as little as £300. Joel Gibbard, the founder of Open Bionics, simply scans the patient's healthy hand with a sensor linked to an iPad, then uses the 3D printer to copy it. Gibbard hopes to see the bionic hands on the market next year for under £1,000. The low price would make it a vastly cheaper solution than most other methods. The Italian firm YouBionic has also been developing bionic hands using 3D printers. The company plans to send technical updates to the hands to the patients' smartphones. They could be downloaded and installed like any app.



BIOPHYSICIST\_HUGH HERR

so a person with completely normal legs can walk with less energy. We still have some way to go to commercialize the product, but it has profound implications for how we see ourselves as humans."

Herr is as much philosopher as scientist and loves to muse about the implications of his bionic creations. In the near future, he says, bionic devices will enable all of us to get better at walking, running and lifting things. When that happens, we will abandon our cars and run to work. "If you don't have cargo, it's absurd to transport the body by getting in big metal boxes with wheels. It's environmentally bad and a crazy waste of space in cities. Soon we will have personal flexible mobility suits which you hang up on coat-racks. The architecture of cities will change. There will be more natural surfaces and less pavement."

### Man or machine?

Herr has some way to go in moulding synthetic materials to human tissue and maintaining levels of comfort. But he predicts technologies which augment physical and cognitive abilities will help to define the 21st century. Unlike the airplane, car and Smartphone, these technologies will be intimate with our bodies and brains. Technologies implanted inside us will blur the distinction between man and machine.

"Once we get the merging of the synthetic built world and our biological tissues, it gets confusing," he said. "Is the synthetic part fully integrated with my tissues part of who I am? And, if part of me is synthetic, am I still human? And how much of me can be replaced by synthetics whilst I am still considered a human being?"

The futuristic ideas and brilliant inventions of the mature Hugh Herr would have amazed the despairing teachers at his high school in Lancaster, Pennsylvania. They wrote the teen off as an academic no-hoper who only wished to climb and improve his fitness in the gym. "I would do anything to get out of the classroom," he admitted. "If you'd asked me at the age of 17 what 10% of a hundred was, I wouldn't have had a clue."

But Herr's climbing obsession was an expression of a single-mindedness in pursuit of his goals which was later to make him the leader of the bionic age. By the age of eight, he had scaled the face of the 3,544 metre Mount Temple in the Canadian Rockies. By 17, he was acclaimed as one of the best climbers in the US.

Herr's climbing feats attracted a fan club that included 20-year old Jeff Batzer. In January, 1982, the pair set out to climb a difficult ice route on Mount Washington, in New Hampshire. Caught in a blizzard, they spent three nights clinging to each other to withstand temperatures of -20 °F (-29 °C). Herr hallucinated and was

convinced he would die. Meanwhile, a rescue party was searching for them and tragedy struck when an avalanche hurled 28-year-old volunteer Albert Dow against a tree killing him instantly.

By the time the two climbers were rescued and airlifted to a local hospital, they had severe frostbite and gangrene threatened to spread throughout Herr's body. Seven operations failed to repair the blood flow to his legs. At this point, Herr learned about Dow's death and cursed his own recklessness. After weeks of palliative treatments had failed, Herr's legs were amputated below the knees. Traumatized by the loss, he cried every other hour for months. In honour of Albert Dow, however, he vowed never to feel self-pity.

Herr was fitted with artificial legs, but he was appalled by the low quality of prosthetics available in 1982. He knew they would never allow him to climb with his former agility. "It was staggering to me that I was given an artificial leg made out of wood and rubber without any computer or actuator in the age of going to the moon," he said. "It set me on a trajectory designing first my own limbs and then for others as well."

Ironically, the climbing-obsessed student who had bummed out of classes was now forced to study how to create prosthetic legs in order to climb again. Having done metal work at school, Herr had some idea where to begin. But he had to become an autodidact, poring over maths textbooks. Months

ONCE WE GET THE MERGING OF THE SYNTHETIC BUILT WORLD AND OUR BIOLOGICAL TISSUES, IT GETS CONFUSING. "IS THE SYNTHETIC PART FULLY INTEGRATED WITH MY TISSUES PART OF WHO I AM? AND, IF PART OF ME IS SYNTHETIC, AM I STILL HUMAN?"



after the accident, Herr took his acrylic legs and headed for the mountains. Using rock faces as a testing ground, and a bag of tools as implements, he started to sculpt the legs as he climbed. Within a year, he had returned to his pre-accident climbing ability and after two years he exceeded it.

The unprecedented prosthetic feet he created enabled him to stand on small rock edges. Titanium-spiked feet helped him to climb ice walls. The flexible prostheses extended his height from five to eight feet to reach cracks and ledges that had been out of reach for the able-bodied teen. "That experience was profoundly motivating. Not only could I eliminate my disability, but I could go beyond what nature had intended," he said. "I had some pretty funny reactions from climbing friends. One fellow threatened to cut his own legs off and get artificial ones."

#### Searching for perfection

Herr continued to modify his designs, searching for perfection. Realizing he needed more knowledge, he began studying at Millersville University, Pennsylvania in 1985. He fell in love with physics and went on to study for a master's at MIT in mechanical engineering, then a PhD in biophysics at Harvard, and finally a postdoc back at MIT in biomedical devices. All the while, he was working on his designs for knee joints, ankle joints and knee braces.

Herr's BiOMs are unlike other artificial legs because they emulate lost muscle function rather than relying on the remaining muscles to propel the leg. They are attached with synthetic skin that moves like real skin. They bend like real joints and flex like real muscles. "A large proportion of MIT studies are about how normal physiologies stand and walk and run. Studies of the human body completely determine the design of the synthetic limb that

## HOW MUCH OF ME CAN BE REPLACED BY SYNTHETICS WHILST I AM STILL CONSIDERED A HUMAN BEING?

emulates functionality. I call it stealing from nature," Herr said.

As well as improving quality of life, the machine precision of the bionic limbs is redefining ideas of human beauty. Herr maintains that once the devices exceed the efficiency of human limbs, they become 'sexy'. The ugliness of most prosthetic devices is not a consequence of their

unnatural shape, but because they result in a low quality of life. Patients limp and feel tired; chafing produces sores. Eventually, stress on the limbs leads to arthritis and bad backs.

"Beauty has a lot to do with function. Once you have a bionic limb which has a high level of function, it becomes cool and sexy even if it doesn't look like a human shape," he said. "In fact, it can be very pleasing for it not to have a human form of beauty but to have it expressed as a machine beauty. A sports car doesn't look like a beautiful woman or man, but it's powerful and sexy. There's no requirement that artificial limbs take on a human beauty. Once you have high functionality, it's a completely new landscape in terms of social appeal and aesthetics."

So far, Herr's research group has developed knee prostheses and ankle-foot exoskeletons for patients suffering from drop foot, as well as the first bionic foot and calf system, called the BiOM. Although tens of millions of dollars have been invested in MIT's research, Herr says there is a more sophisticated way to look at the economic impact. "The real cost drivers are the fact that the person can't work and pay taxes, the fact they need healthcare, home care, a live-in nurse, or hospital-



LEFT: HUGH HERR GIVING A TED TALK. ABOVE: PURSUING HIS PASSION, FREE CLIMBING.

ization. And they need pain medication and surgeries. In the age of bionics, where you can give people back their God-given capability, you end up saving money even though the prosthetic intervention is a lot more expensive than previous interventions that don't fully repair the human," he said.

Herr gives the example of a young man from Ohio who lost a leg in an industrial accident. He was out of work because the conventional prosthesis would not allow him to walk around without undue discomfort. "We fitted him with a bionic limb and a week later he called his boss and said 'I'm coming back to work'. The actuary data shows that if you don't get a young person back to work in nine months, they will be lost to drugs and alcohol and typically cost the state US\$5 million-US\$8 million over a lifetime. So, yes, the bionic limb is more expensive, but it can save millions of dollars for one individual and trillions for the nation. When true bionics replicates human biology it's a win for the patient and it's also a win for the payer."

The problem, Herr said is that there are few examples of real bionics. But he predicts that will change in the next decade or two, as different disciplines cooperate to find solutions. "So many subjects are relevant to the bionic age. We are seeing the blending of mechanical engineering, with electrical engineering and neuroscience, but also fashion design and art are relevant," he said. "We are now at the point of history where there's enough maturity in the disciplines to produce real examples of bionics!"

## TWO ROBOTIC ARMS CONTROLLED BY THOUGHT

IN THE US, GROUNDBREAKING RESEARCHERS AT JOHN HOPKINS APPLIED PHYSICS LABORATORY UNIVERSITY HAVE PROVIDED A DOUBLE-AMPUTEE FROM COLORADO WITH TWO MIND-CONTROLLED LIMBS. LES BAUGH, WHO LOST BOTH ARMS IN AN ELECTRICAL ACCIDENT 40 YEARS AGO, IS ABLE TO CONTROL THE BIONIC LIMBS SIMPLY BY THINKING ABOUT MOVING THEM.

After training his muscles to use the new arms, Baugh had a sophisticated level of functionality, lifting small cups to a higher shelf, which required him to coordinate the control of eight separate movements. Principal investigator Michael McLoughlin said: "We're just getting started. It's like the early days of the internet. The next five to 10 years will bring phenomenal advancement." The next step, McLoughlin said, is to send Baugh home with a pair of limb systems so he can see how they integrate with his everyday life.

Baugh was the first bilateral shoulder-level amputee to wear and simultaneously control two of the Laboratory's Modular Prosthetic Limbs. Before using the system he had to undergo targeted muscle reinnervation surgery at Johns Hopkins Hospital. "It's a relatively new surgical procedure that reassigns nerves that once controlled the arm and the hand," said surgeon Albert Chi. "By reassigning nerves, it's possible for people who have had upper-arm amputations to control their prosthetic devices by merely thinking about the action."

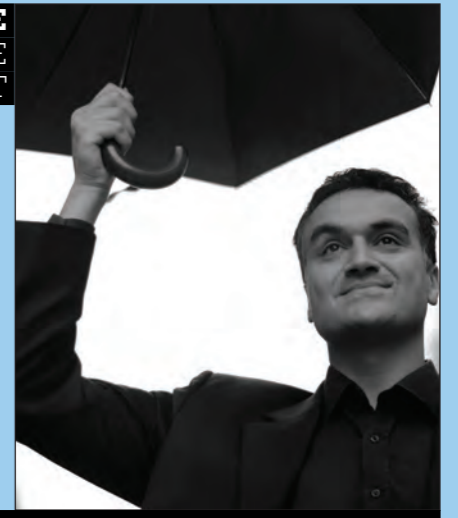
Chi said researchers used pattern recognition algorithms to identify individual muscles that contracted "We assess how well they communicate with each other, and their amplitude and frequency. We translate that information into actual movements within a prosthetic." After surgery, Baugh was fitted for a custom socket for his torso and shoulders that support the prosthetic limbs and make the neurological connections with the reinnervated nerves. While the socket got its finishing touches, the team had him work with the limb system through a Virtual Integration Environment (VIE), a virtual system which is completely interchangeable with the prosthetic limbs.

When the socket was fitted, Baugh was delighted with the results. "I went into a different world," he said. He was quickly able to carry out high-level tasks, such as moving the cup. "These tasks simulated activities that may commonly be faced in a day-to-day environment at home," said Courtney Moran, a prosthetist working with Baugh. "This was significant because this is not possible with currently available prostheses. He was able to do this with only 10 days of training, which demonstrates the intuitive nature of the control."



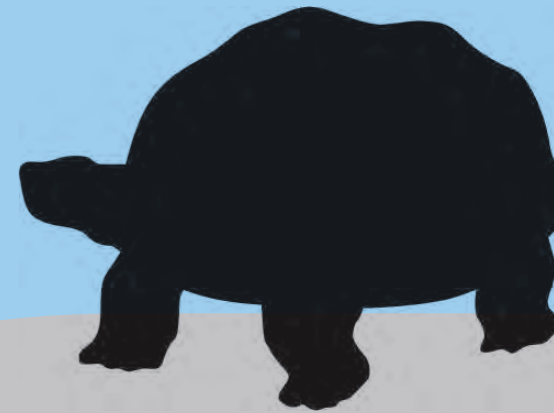
# THERES NO BUSINESS LIKE SLOW BUSINESS

**CARL HONORE**  
GODFATHER OF THE SLOW MOVEMENT



CANADIAN-BORN AUTHOR CARL HONORE BECAME FAMOUS AS THE 'GODFATHER OF THE SLOW MOVEMENT' FOLLOWING THE PUBLICATION OF HIS FIRST BOOK – IN PRAISE OF SLOW – IN 2001. HE TELLS DAVID W. SMITH WHY THE CULT OF SPEED HAS FAILED US AND HOW A SLOW BUSINESS STRATEGY MAKES STAFF MORE PRODUCTIVE

[ BY CARL HONORÉ ]





**What are the origins of Slow and how do you define it?**

Some people argue that the Slow movement is a child of the Slow Food movement, which began in Italy, but that's only partly true. Slow Food provided the word "Slow" as a catch-all label for a new philosophy of life, but many strands of the Slow movement – such as yoga, meditation, working fewer hours and mindful sex - pre-date the creation of Slow Food.

To me, Slow with a capital "S" is about doing everything at the right speed, rejecting the diktat that "faster is always better" and savouring the hours and minutes rather than just counting them. It's about quality over quantity in everything from work, to food to parenting. I am not a fundamentalist of Slowness, however. If we slow down too much in one way, we run the risk of forcing ourselves to go faster than we'd like in another.

**How does it influence your life?**

In the past, every moment was a race against the clock. Now I do fewer things, but I do them better and enjoy them more. I take breaks during the workday to relax, eat and meditate. I stopped wearing a watch, which made me less neurotic about time. I switch off my technology - email, iPhone - whenever possible, to avoid being always connected. I often say no to work or social offers to avoid getting overloaded.

**Many people will say, okay I need to slow down at home, but I can't at work. What do you say to that?**

People get hung up on the work-life balance argument. I think it's a false dichotomy. People don't go off to work to be busy and frenetic then come back to be Slow. The virus of hurry has infected every corner of our lives. Where I live in London there are lots of ambitious alpha families. Many of the wives don't work, yet they still run around like headless chickens over-scheduling their children, constantly looking at their Instagram feeds, competing with the other triple A mothers.

**How does the cult of busyness manifest itself in offices?**

One way is in feeling pressurized by the tyranny of "face time". This means putting in long hours even when you are not being more productive. We have inherited a vision of time from the 19th century when people used big clocks to time the workforce. But such an approach is much less effective in a knowledge economy.

People need to be thinking, letting their minds wander, building rapport with clients and teams members, but we've imbibed with our mother's milk the notion that the more hours you spend at work the better an employee you are. You get absurd behaviour such as leaving a coat to give the impression you're there, opening up several windows on your desktop to show you're busy, or timing emails to be sent out at 1am to suggest you're working late. Busyness becomes an end in itself.

**How has technology exacerbated the cult of speed?**

Constant connectedness means our lives are a perpetual inbox. A recent McKinsey study showed knowledge workers spend 28% of time dealing with their inbox. In what world is that efficient? Cell phones, email and texting are wonderful, but a 24/7 technology habit creates dependency and anxiety when texts aren't immediately answered. Research shows the deluge of messages and information can cause our IQ level to fall more than would smoking marijuana. It can also lock us into what a former Microsoft researcher called a state of "continuous partial attention" – constantly flitting from one conversation, one information stream, one stimulus, to the next. You cannot be truly "in the moment" when you're juggling several moments at once. Constant connection also makes us chronically impatient. As the actress Carrie Fisher once quipped, these days "even instant gratification takes too long". What types of things are forward-thinking companies doing?

The boldest and most imaginative workplaces are moving away from the obsession with micromanaging and measuring everything. A big part of that is the antiquated command and control model, where you have a guy - usually a guy – sitting in the corner counting working hours and watching over people. But that's not how we will find the next Google, or solve cancer in a bio-tech lab. You've got to set people free.

There's a huge move towards freedom in the workplace. In the US the World Blu movement is moving away from command and control fear-based environments to ones where people are not afraid to stand up and say "no, I don't agree with this".

Of course, we need hierarchies some of the time, but there's a great deal of hard evidence that when you give people control over their own time you unlock untold emotional and intellectual riches. The ROWE movement – Results-Only Work Environment – is a management strategy where employees are evaluated on

performance, not presence. The boss says, "This is what we want, this is the deadline. Between now and then, you do what you have to do. If you want to work until midnight on Saturday, or leave at 2.30pm on Thursday to see your daughter's ballet, that's fine, as long as you get the work done". Once companies take that leap of faith, employees are happier, healthier, and come back to the office with better ideas. When it comes to the deadline, they knock the ball out of the proverbial park.

**Ceos might think, well it all sounds fine, but I am under so much pressure. I can't take the risk. What do you say?**

I say fortune favours the brave. That's as true in business as in warfare. The tide is turning and a lot of companies are realizing that staff are not robots with one turbo speed. There is only so much productivity you can squeeze out of a human being before they start to suffer. That's why some of the most innovative companies are experimenting with shorter working weeks. Even the biggest banks on Wall Street – such as JP Morgan and Goldman Sachs - have cut working hours for junior bankers. It boils down to the counter-intuitive idea that the best way to get ahead in a fast world is to slow down. Being stuck in roadrunner mode leads to inefficiency and stressed-out employees.

**If an employee wants to slow down, but the company demands speed, what are the options?**

You cannot slow down quickly. You have to start a dialogue within the company. Start talking to your boss, your colleagues, the Human Resources department. Hold a seminar on using time more efficiently. The chances are other people are also yearning to slow down. You need to explain that the Slow worker will, ironically, end up being faster than the fast worker. In the workplace, Slow forms of communication often turn out to be faster than fast ones, too. For example, sometimes you can sort out a problem with a colleague by getting up from your desk and talking face to face – instead of spending the afternoon playing email ping pong.

**What is the role of Mindfulness in the Slow movement?**

Meditation, or Mindfulness, is massively popular now in the corporate world. It's the slowest thing you can do short of going to sleep, but it has demonstrable payoffs. Research shows it improves concentration. People make better decisions and feel happier. Meditation also rewires the brain by increasing the level of gyrification, meaning there are more folds in the cerebral cortex and that helps you process information faster. The delicious paradox of Slow is that by slowing down judiciously at the right moments, people are better able to go faster when they need to.

**Is Slow business just about productivity?**

No, there's the much bigger question of what is the economy for? It's about what kind of world we wish to bequeath to our kids and grandkids. Do we really want them to live in an unfulfilling culture of turbo-charged, hyper-productive capitalism? The system is broken anyway. In the lead up to the meltdown in 2008, the markets were based on fast growth, fast profits and fast consumption. No one had time to challenge the model, or analyze these immensely complex financial instruments. Turbo capitalism brought the economy to its knees and made us unhappy. People are desperate for an alternative.

Modern capitalism has also seen a modern version of the 19th century's dark satanic mills in the call centres and Amazon warehouses where people are rushed around from pillar to post and their bathroom and lunch breaks are timed. It's dehumanizing and alienating.

So what kind of system do we want to have? We will probably end up going for the free market capitalistic model, but it's a question of not letting the deeper meanings get brushed aside when people are just looking at the next thing on the to-do list.

**Are you optimistic?**

Yes, I am. When my first book came out 10 years ago I felt like a voice in the wilderness but the change in the argument since then has been epic. The new generation of kids want to do well, but they also want to do good. That's an important shift. My generation was more about just getting ahead. We're seeing a boom in social enterprises, as well as a greater awareness of inequality and the environment. It's like a giant Venn Diagramme with lines intersecting in the middle. The word I use to describe that middle is Slow. All the trends meet there.



THE DELICIOUS PARADOX OF SLOW IS THAT BY SLOWING DOWN JUDICIOUSLY AT THE RIGHT MOMENTS, PEOPLE ARE BETTER ABLE TO GO FASTER WHEN THEY NEED TO.

[ CARL HONORÉ ]

# USCHA POHL IS VERY COMMITTED TO

# FILM

USCHA POHL, THE COOL GERMAN FASHION DESIGNER AND PUBLISHER OF *VERY MAGAZINE*, HAS CREATED A SERIES OF FLOOD AND DROUGHT FILMS ABOUT CLIMATE CHANGE. IT'S A SIDESTEP FOR POHL, BUT SHE TELLS DR HAMIRA RIAZ, CLINICAL PSYCHOLOGIST AND BUSINESS CONSULTANT, WHY SHE VALUES **MITDENKEN**, OR THE ABILITY TO THINK FOR ONESELF.

Uscha Pohl describes herself as a German residing in London and Paris, with a base in New York. In short, she is one of those effortlessly cool people who can boast an envy-inducing CV and yet wears her success lightly. She started out as PA for Vivienne Westwood in the early 1990s before becoming the operational lynchpin at the house of Japanese designer, Koji Tatsuno. She was already selling her own 'leather and zips' inspired line, Up & Co, in New York, when the next chapter of her career began taking shape. Her incarnation as gallerist and curator meant she was at the vanguard of the BritArt movement and helped many unknown Young British Artists cross over to the US. Pohl's fashion-art hybrid *VERY* magazine was born in the mid 1990s and was soon followed by *VERY* style guides and *VERY* style maps.

Reflecting on the frenetic first years, Pohl said: "Starting my own projects coincided with the arrival of the first Apple Powerbooks, which opened a whole new world. With this matte grey box in hand I could run a gallery, fashion business and create an international culture magazine. Today, one can do all these things from a phone, but back then the first laptops were the greatest revolution."

As you learn about Pohl's life, several threads emerge that are characteristic of the career journeys of entrepreneurs. Early on, she saw herself as an outsider which made her comfortable breaking

rules. In her words, "not looking at other peoples' work is the only way to be innovative". Instead of taking the academic route, she learned a portfolio of trades on the job. Only now, belatedly, has she found time to study for a PhD. She is willing to take risks and quickly adapts her approach to business whilst on the move. She follows her passions and is clear about what she wants. She doesn't see the barriers others do, won't take no for an answer and enjoys proving naysayers wrong. The editorial aesthetic driving *VERY* magazine reflects Pohl's ability to join up the dots between different worlds. This set of skills also explains her latest venture – the *VERY* magazine discovery channel, *VERY*documentary.

### Stream of consciousness

Talking to Pohl is like communing with a speeding train. Thoughts tumble out in a stream of consciousness commentary. Pauses happen only when there is no obvious British translation of a German word. Uscha is great fun and her energy is infectious so it is hard for listeners not to be swept away by her current *idée fixe*. Her passion for environmental issues started with the same question that left many of us scratching our heads back in 2012. How could England be in a drought during a flood? April was the wettest on record, but it took until July that year for the last of



[ Uscha Pohl ]

I DON'T LIKE TO BE TAKEN FOR A FOOL. WHILE IT RAINED DAY AFTER DAY FOR MONTHS, THE HOSEPIPE BAN AND ITS MEDIA COVERAGE LAID THE BLAME FOR THE INVISIBLE 'DROUGHT' ON THE CONSUMER

the hosepipe bans to be lifted. Was it bureaucratic lunacy, corporate skulduggery, or modern-day madness? It turns out you can take your pick. As Pohl puts it: "I don't like to be taken for a fool. While it rained day after day for months, the hosepipe ban and its media coverage laid the blame for the invisible 'drought' on the consumer. Anyone could see that car washing or garden watering (£1,000 fine for either) had nothing to do with the problem."

Pohl's determined search for an answer to the hosepipe conundrum took her all over the world. The first significant conversation was with her friend, Francis Fry of the Fry chocolate family, whose Rajakkad Garden Hotel in Tamil Nadu is set among a 50-acre working plantation. They talked about why India's monsoon water was being left to run into the sea and tried to understand why no one had thought about catching it. That was just the beginning of her search for answers. She has spent the past two years talking to experts on water cycles, organic carbon farming and biodynamic winemaking. What she found is disturbing. Yes, we know we are killing the planet with rampant deforestation, the overuse of agrochemicals, the dominance of monoculture farming and rising levels of greenhouse gas emissions. Yes, the quality of soil in the greenest of countries is rapidly deteriorating, so that Dr John Baker, nominated for the World Food Prize in 2012, says it is the "world's most critical issue".

But have we woken up to the fact that all of these issues are intimately connected? And do we realize we still have a chance to change this for the better if we act now? Pohl doesn't think so and so in October, she started the next stage of her quest to raise awareness with the release of four documentary shorts from the Flood & Drought series. Films I-IV are each between six and eight minutes long. They contain sweeping vistas of lush English countryside, commentary from the glamorous Femi Taylor, ill-boding pronouncements delivered with British understatement by the likes of water power engineer, Osman Goring, and sustainability consultant, David Stanley, interspersed with loving shots of angelic children, including Pohl's five-year-old son, Lukas.

Pohl says: "The films don't stem from a film-making tradition, which I have no clue about. They are informed by my other professions... short, designed for the busy person, clearly structured to decipher a complex situation. I believe you need a compelling presenter. Pace and rhythm are key. The editing cuts, together with the sound, have to propel the right movement and drive. While explaining the issues at hand, the films highlight what can be done. Each sequel ends with solutions. The films follow my learning curve. They are my own 'discovery channel'."

### Say it simply

Film I – Drenched in Drought explains the coincidence of flood and drought; film II – Floody Farming, explores the role of chemical farming in desertification; film III – The Soil Carbon Solution offers a fix in the form of natural carbon sequestration, and Film IV – Farming, Food and TB, looks at the links between chemical fertilizer intensive farming, the way animals are reared and nutritional value. The central message is hard to forget and difficult to dismiss. They are true to Pohl's motto, "If you can't say it simply, think again. Simplicity equals purity, which I hope is the common denominator in everything I do."

As for the lady herself, after hours of conversation, we keep coming back to one word, 'mitdenken' – a German term Pohl finds untranslatable. The literal translation is "the ability to think for oneself". It sums her up and encapsulates what she wants us all to do. Pohl is now editing Film V – Grass Matters, with at least a further seven films in the pipeline including *Bees are Us* and *Toxic Grapes*.

Films from the Flood & Drought Series are available to view on [www.verymagazine.org/film](http://www.verymagazine.org/film)

PICTURE: JAN HÖHE

**CHRIS OESTERICH**  
THE FINANCIAL FUTURIST



**Radical Intrapreneurs**  
*have the creativity  
to thrive in modern  
workplace*

TOO MANY PEOPLE ARE TAUGHT AT SCHOOL TO FOLLOW THE RULES SLAVISHLY SO WHEN THEY GET INTO AN OFFICE, THAT'S WHAT THEY DO. BUT RADICAL INTRAPRENEURS WILL BE ABLE TO ADAPT SWIFTLY AS THE RULES OF THE GAME CHANGE

slide rules, we may still find a place in the business world, but if this is where we're headed, are our days of prominence already behind us?

**The era of lifetime employment is over**

Imagine your career as a brisk, steady walk down a straight and narrow trail.

Get the job, show up, keep your head down, crank out work, collect your gold watch, and receive your pension.

**Does that sound like the path you're treading?**

The company man had a good run, but his pine box was nailed, lowered, and covered a while ago. Rather than a long amble down a well-worn path, the experience feels more like a frenetic swim upstream wherein the waters are murky, the current is accelerating, and dangers lurk at every turn.

**Does that sound familiar?**

Let's briefly consider that earlier era. Once you had relatively secure employment, you could choose between a life of relative ease or going back to school for an advanced degree to really differentiate yourself.

Today's version of this story harks back to Professor Hamel's point about commoditization. As the graph below shows, the number of graduate degrees awarded by business schools has increased by an order of magnitude over the past 40 years. Yesterday's differentiator has become today's commonality. That said, formal education is still one of the best routes for improving ourselves. I just want

The nature of work is evolving and we must respond by changing the way we approach our careers. Failing to react is choosing to accept the consequences. Discounting the forces which drive them is either an act of willful ignorance, or worse. Consider yourself warned.

I'm preparing a talk to help early career professionals shorten learning curves so they might be more purposeful and productive. A big part will focus on becoming radical intrapreneurs to create a bit of security in a turbulent sea of precarity.

**Gary Hamel's Hierarchy**

One key concept is Gary Hamel's Hierarchy of Human Capabilities at Work. It reveals the consequences of an increasingly educated and connected global workforce. The model includes six elements: Obedience, Diligence, Intellect, Initiative, Creativity, and Passion. It's split into two with the lower half being viewed as table stakes. The upper section consists of differentiating traits.

This model is aimed at leaders, but it's a wake-up call for all professionals. We've

been taught to aim for the first three layers of this hierarchy as our school systems are geared to instill obedience, diligence and intellect.

Follow the rules. Don't color outside the lines. Sit still. Stay focused. Don't look out the windows. Do your work. Quit daydreaming. Solve the problem.

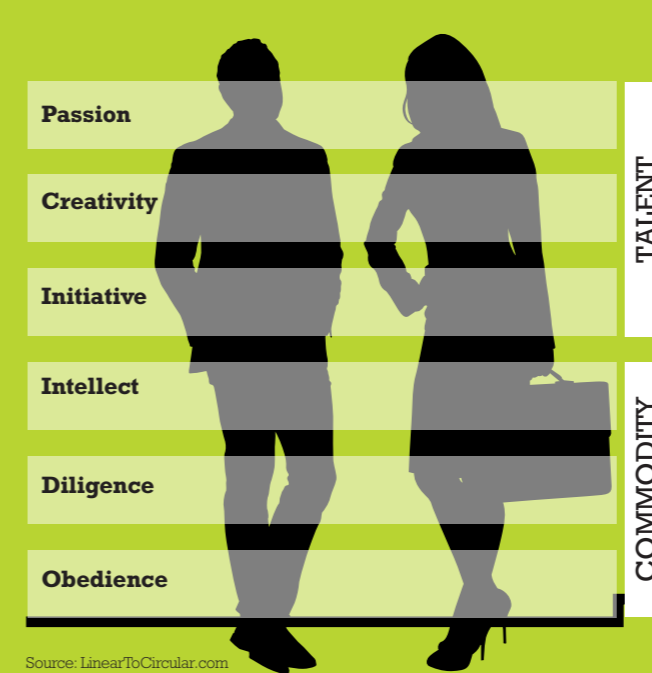
So we arrive in our careers ready to do as we're told, work hard, and solve problems. And that's becoming a problem. Think of it. Workers perceived as commodities. Human beings treated as widgets.

If this sounds like the talk of a couple of misguided Cassandras, I should say Professor Hamel is cited by the Wall Street Journal "as one of the world's most influential business thinkers". Other thinkers in this field are equally respected. Stowe Boyd is the well-respected lead researcher at Gigaom, and Harold Jarche is a thought leader in workplace transformation. If I'm woefully misguided, I'm in great company.

It seems most global business professionals have put in an awful lot of work, while taking on copious amounts of debt. Much like buggy whips, and

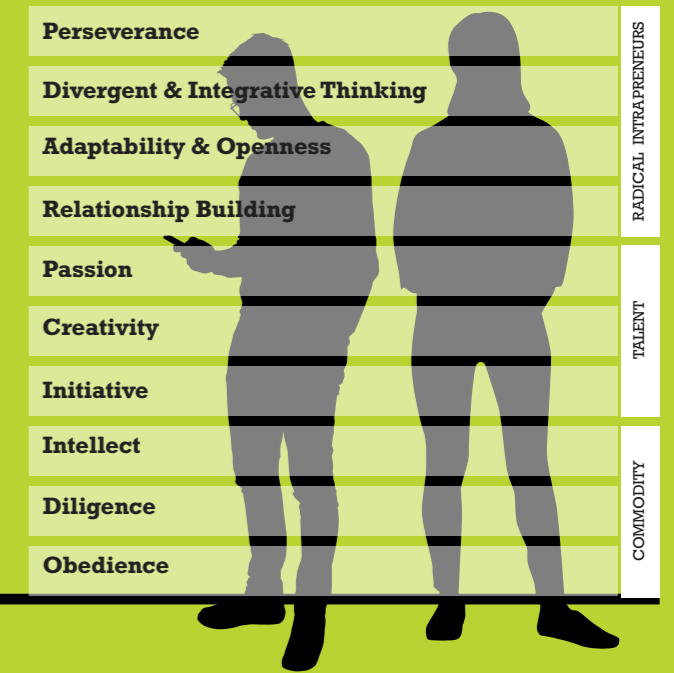
# WORKPLACE STATISTICS

**[Gary Hamel's] HIERARCHY OF HUMAN CAPABILITIES AT WORK**

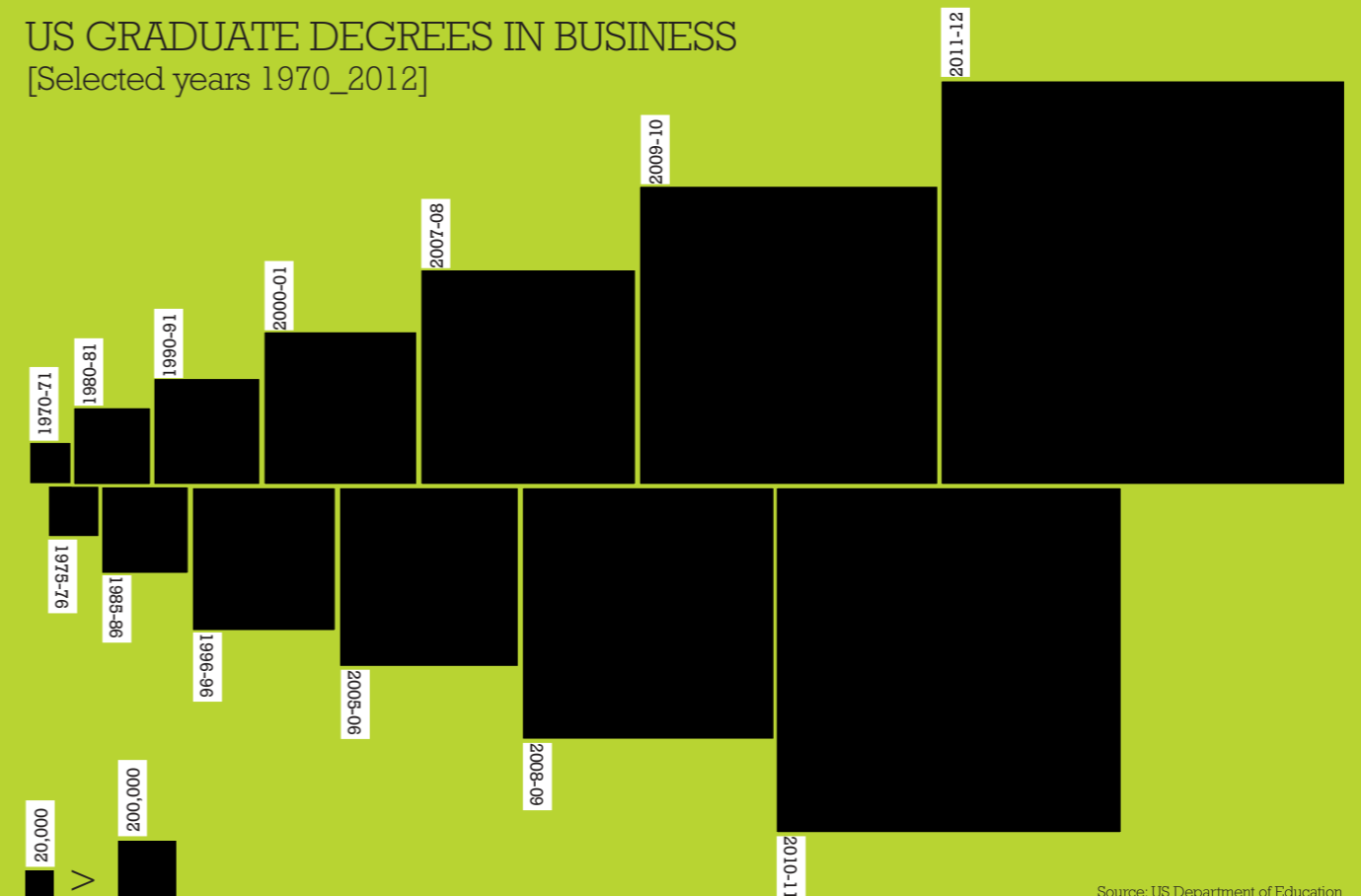


Source: LinearToCircular.com

**[The Radical Intrapreneur's] HIERARCHY OF HUMAN CAPABILITIES AT WORK**



**US GRADUATE DEGREES IN BUSINESS**  
[Selected years 1970\_2012]



Source: US Department of Education

you to review your expectations and consider what you might add to your plans to achieve success.

#### From pigeonholes to widgets to obsolescence

Concerns over technological unemployment have been with us since the Luddite Rebellion, but current trends portend unprecedented job destruction. We're used to robots taking jobs on farms and factory belts, but are we ready for driverless cars putting all driving professions at risk? You may be thinking that a degreed professional has some insulation from all this, but remember robots are learning to perform general surgery. An Oxford Martin School study suggests nearly half of employment is at risk of computerization. Stowe Boyd asks, "What are people for in a world where only a minority are needed to guide the robot-based economy?"

#### So, is there any hope?

What bargaining power do you think you would have if millions were equally capable of performing your duties? How could you pay off your debts if there was a wage-based race to the bottom?

Fortunately, Professor Hamel provides hope with the upper layers of his hierarchy (Initiative, Creativity, and Passion). These traits help workers stave off commoditization. Harold Jarche is instructive here, "This Creative Economy requires more independent workers - with traits that cannot be commoditized: Initiative; Creativity; Passion. So 'knowledge workers' had best ensure that, firstly, they have more Task Variety than Standardized Work and, secondly, they are valued for skills that cannot be commoditized." He further states that, "Being able to fill a job is not enough, even if it is an honest day's labour. The capitalist system is designed to screw labour. But it's more difficult to screw talent. If we want to help people, we need to help each person become Talent. That means emphasizing creativity, complex problem-solving, and innovation."

As Doug Sundheim notes, "Successful innovators care about solving interesting and important problems — innovation is merely a byproduct." Passion is fuel which drives us in this regard. We often seek engagement, but engagement is not self-sustaining. I equate being engaged with the state of Flow studied by psychologist Mihaly Csikszentmihalyi. It's not a place you're likely to arrive at by accident. Passion is the force which can help you achieve and maintain engagement. Don't aim for engagement. Find your passion and you'll arrive at engagement.

#### Updating Hamel's Hierarchy

There are additional elements (Relationship Building, Adaptability and Openness, Divergent and Integrative Thinking, and Perseverance) which help us fit the model to radical intrapreneurs.

- Relationship Building – You may run into the occasional

opportunity where you can affect meaningful change alone, but you're typically going to need a tribe to help you. Moreover, there will be moments when you'll be ready to throw the whole idea out the window. In these moments, you'll be glad you've got a tribe to pick you up and dust you off.

- Adaptability/Openness to Experience - Given our constantly evolving business environment, rolling with the punches is a prerequisite. How can you lead change if you are simultaneously whining about the unapproved repositioning of your cheese? I've lumped in openness to experience here as I see it as the other side of the change coin. As one side refers to the ability to handle change as it comes at you, the other deals with willingness to seek it out. Arthur Schopenhauer famously stated, "Talent hits a target no one else can hit; Genius hits a target no one else can see." Genius hits that target because it's ever searching for it. Having an infinite number of monkeys type a bit of Shakespeare isn't genius; it's dumb luck. If you want to hit a target that others aren't aware of, you can either fire arrows randomly into the sky (please don't!), or you can work for it. Genius is generally the result of hard work. If you want to get in on that game you've got to continually seek it...
- Purpose - Aaron Hurst, the founder of both Taproot and Imperative, states that purpose is something we get from relationships, doing something greater than yourself, and personal growth. As radical intrapreneurs will take their share of lumps, they'll need the support and sense of belonging which good relationships can provide. I can't count how many times I've "had it up to here", when a peer has reminded me how far we've come and how close we are to achieving our goals.
- All of these traits, from Obedience to Purpose, combine with their knowledge, skills and experience, to form a unique offering that only individuals can provide. Nilofer Merchant's no's defines "Onlyness" as "that thing that only that one individual can bring to a situation. It includes the journey and passions of each human. Onlyness is fundamentally about honoring each person: Each of us is standing in a spot no one else occupies." We all have something special to bring to the party, if we believe in ourselves and cultivate these gifts.

If the lyrics of N.W.A.'s Express Yourself are a reliable indicator, it would seem Dr Dre subscribes to this concept: "It's crazy to see people be what society wants them to be, but not me." That approach has worked out pretty well for him.

The dustbin of history has scant sympathy for plants and animals which didn't adapt to evolutionary forces. The same goes for us. Don't allow yourself to be "buggy whipped". Don't be what society wants you to be. Be different. Be the person that only you can be. Be a radical intrapreneur.

IN INDUSTRIALIZED COUNTRIES WE EAT JUST UNDER 200G OF MEAT A DAY, WHICH IS ALMOST 1.5KG OF MEAT PER WEEK. IT'S FAR TOO MUCH - MORE THAN TWICE THE HIGHEST LEVELS RECOMMENDED FOR OUR HEALTH - AND DEVELOPING COUNTRIES ARE MOVING TOWARDS THE SAME LEVELS.

ROB BAILEY,  
CHATHAM HOUSE



# HOW CHANGING YOUR DIET COULD HELP SAVE THE PLANET



[[ IT'S NOT NECESSARY FOR EVERYONE TO BECOME VEGETARIAN, BUT CHANGING WHAT WE EAT **WILL HELP THE WORLD** TO MEET ITS 2050 CARBON EMISSIONS TARGETS. THE PROBLEM CAN BE TACKLED, BUT ONLY IF THE WORLD'S GOVERNMENTS STOP IGNORING THE ISSUE AND SUBSIDIZING CHEAP AGRICULTURAL PRODUCTS. ]]



Few people appreciate the direct link between eating too much meat and dairy products and climate change. The arguments are quite scientific and not widely understood. And there's also something of a taboo on discussing the subject. In rich Western nations, preaching about how eating a lot of meat is bad for both one's health and the planet provokes resentment. Meanwhile, in developing nations, the rising middle-classes can at last afford to eat more meat. It's not surprising Governments duck out of tackling the problem.

Scientists don't say everyone has to become vegetarian. But they argue we need to eat much less meat and dairy. Otherwise, say researchers for the new report from UK thinktank Chatham House, the global agriculture sector will consume the world's entire carbon budget by 2050. This means every other sector, including energy, industry and transport, would have to be zero carbon to keep global temperature rises below the United Nations' target of 2 degrees Celsius, which the report says would become an "impossible" goal. It concludes: "Dietary change is essential if global warming is not to exceed 2C."

The lack of awareness of the problem is evident from the results

of an Ipsos MORI survey quoted in the Chatham House report. Although livestock produces more greenhouse gases than all cars, planes, trains and ships combined, twice as many people think transport is the bigger contributor to global warming. Meanwhile, appetite for meat is soaring as the global population swells and becomes more able to afford it. Meat consumption is on track to rise 75% by 2050, and dairy 65%, compared with 40% for cereals. By 2020, China alone is expected to be eating 20 million tonnes more of meat and dairy a year.

The report's lead author, Rob Bailey, said: "Preventing catastrophic warming is dependent on tackling meat and dairy consumption, but the world is doing very little. Most people are aware of the role of deforestation, transport and power generation in contributing to climate change, but they have no understanding of the role of livestock."

The scientific arguments are outlined in the report. Livestock production is the largest source of both methane and nitrous oxide, two of the most damaging greenhouse gases. Nitrous oxide is found in manure and fertilizers, whereas the methane emissions come from burping cattle and sheep. On current trends, emissions of both methane and nitrous oxide will double by 2055 from 1995 levels.



SATELLITE IMAGE OF FARMING IN MINNESOTA

Excessive livestock farming also causes deforestation when forests are cut down to provide pasture, or become degraded through animal grazing. This releases more CO<sub>2</sub> into the atmosphere.

Some agricultural products are especially carbon-intensive. Beef farming is roughly 150 times less efficient than soy farming per unit of protein. Beef and dairy farming together account for 65% of livestock greenhouse gases. Pork and chicken produce fewer emissions, but the level is still around 25 times greater than soy.

#### Bad for health

"In industrialized countries we eat just under 200g of meat a day, which is almost 1.5kg of meat per week. It's far too much - more than twice the highest levels recommended for our health - and developing countries are moving towards the same levels," said Bailey. "If global populations were on average to eat according to the Harvard Healthy Diet, we'd have a much better chance of limiting global warming to less than 2C, as well as decreasing levels of obesity, cancer and heart disease."

The release of carbon emissions is not the only reason to reduce meat and dairy consumption. Farming to produce animals is also vastly less efficient in its use of water than growing crops for human consumption. A 2014 European Commission study found that the agriculture industry consumed 89% of the European water footprint. This startling fact prompted the researchers to calculate the water footprint for three different diets: Current European diets, ones corresponding to healthy guidelines and vegetarian diets.

In all corners of Europe, the healthy guideline diets had significantly lower water footprints, but the vegetarian ones were slightly better still. In the Mediterranean countries, for example, the water footprint for the healthy diet was 30% less than the average diet. For vegetarian diets, it was 41% less. A generation ago, the gulf would have been narrower, but meat consumption has soared in this part of Europe. It has reached 58.9kg per year, which is three times the recommended 20.8 kg. Of course, obesity levels have followed the same curve on the graph. Even in Eastern Europe, where there is less meat consumption than in other parts of Europe, the water footprint dropped by 11% for the healthy diet and 27% for vegetarian diets.

The co-author of the EC report, Davy Vanham, said: "Although agriculture takes up 90% of the water footprint in the EU, as well as in the US and many other countries, very little is talked about

IF WE WANT TO SAVE A LOT OF WATER WE HAVE TO LOOK AT FOOD CONSUMPTION. MEAT, SUGAR AND MILK ALL REQUIRE A LOT MORE WATER TO PRODUCE. EATING HEALTHIER DIETS IS A WIN-WIN SITUATION. YOU SAVE A LOT OF WATER AND ALSO HAVE A MUCH HEALTHIER POPULATION, SAVING ON HEALTHCARE COSTS

it. The focus is on domestic use so we get campaigns to take showers instead of baths, or use more water-efficient washing machines. But if we want to save a lot of water we have to look at food consumption. Meat, sugar and milk all require a lot more water to produce. Eating healthier diets is a win-win situation. You save a lot of water and also have a much healthier population, saving on healthcare costs. The best solution would be vegetarian diets though it's impossible to turn the whole world vegetarian."

#### Cheap meat

Vanham says the rise in meat eating is down to industrialized methods that have made it cheaper to buy. But the supermarket price does not reflect the real cost. "Two generations ago people ate meat once a week, especially after World War II. But in the EU, and also in the US, they developed a very industrialized and heavily subsidised model of food production. Pollution is not included in the price, but the industrialized process is very polluting. There are all the greenhouse gas emissions, but also the use of antibiotics. Another big problem is that bacteria are becoming resistant to antibiotics because of the industrial meat industry."

Governments worldwide remain wilfully blind to the polluting effects of agriculture. Negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) have focused on deforestation and overlooked livestock emissions. Out of the 40 developed countries in the UNFCCC, only Bulgaria and France have established targets for livestock emissions and just eight of the 55 developing countries to submit mitigation plans mentioned livestock. Brazil was the only one to establish targets to reduce livestock emissions and New Zealand was unique in including livestock in its cap and trade scheme. "Governments are unwilling to legislate because of the fear of a commercial backlash. The food industry in the EU is very big and lobbying is powerful at a national basis," Vanham said.

The dearth of policies to tackle livestock emissions is in marked contrast to the abundance of financial support for meat and dairy producers. Livestock subsidies among OECD countries amounted to US\$53 billion in 2013. In the EU, cattle subsidies alone exceeded US\$731 million, around US\$190 per cow. This generosity is not confined to industrialized countries. In China, for example, pork subsidies exceeded US\$22 billion in 2012, equivalent to about US\$47 per pig.

# 7 Solutions

## SALT'S SEVEN STEPS TO REDUCING MEAT CONSUMPTION

**1** The United Nations should make it mandatory for all nations to include livestock emissions in their carbon emissions targets. This needs to be an urgent matter for discussion at the Paris talks this year. It is hypocritical to continue to focus on other sources of carbon emissions without addressing agriculture because of the fear of a consumer backlash. Agricultural emissions should also be included in cap and trade schemes. So far only New Zealand has taken the livestock sector into account.

**2** Governments have to get over their fear of Nanny State-ism as ignorance is widespread and guidance is needed. For example, national programmes to raise awareness at school level about the environment should include agricultural emissions. It could also be mandatory for supermarkets to include carbon footprint labelling. The measure would have some effect on consumers, but the main reason is to put pressure on manufacturers to look for additional ways to reduce emissions. This is true of eco-labelling in general.

**3** Individuals must eat more responsibly. We can all make a small difference. Research shows the environmental impact of beef dwarfs that of other meat, including chicken and pork. Experts say eating less red meat would be a better way for people to cut carbon emissions than giving up cars. Vegetarianism is an even better alternative. A University of Oxford study found that meat-rich diets - defined as more than 100g per day - resulted in 7.2kg of carbon dioxide emissions. In contrast, both vegetarian and fish-eating diets caused about 3.8kg of CO2 per day, while vegan diets produced only 2.9kg.

**4** Rethink subsidy programmes to the livestock sector, which needs to shrink. The removal of livestock production subsidies is also likely to improve technical efficiency. In New Zealand, a drastic reduction in agricultural subsidies in the 1980s helped create one of the most efficient and environmentally friendly ruminant livestock industries.

**5** Environmental externalities need to be factored into policy frameworks. Livestock holders who provide environmental services need to be compensated, either by the immediate beneficiaries, such as downstream users enjoying improved water quantity and quality, or by the general public. Services that could be rewarded include land management or land uses that restore biodiversity, and pasture management that provides for carbon sequestration.

**6** Water is grossly under-priced in most countries, and the development of water markets and various types of cost recovery would correct the situation. Suggested instruments include grazing fees, and better institutional arrangements for controlled and equitable access.

**7** Consider higher taxes on meat and dairy products based on emissions releases. Rising prices would cause reduction in consumption, with health benefits as well as carbon reductions.

Rob Bailey said: "The fact no consumer has any understanding of this issue makes it difficult to achieve voluntary behaviour change and the fact that governments and businesses and NGOs don't really see it as their place to interfere in lifestyle choices because they fear accusations of 'Nanny State-ism' means everyone is reluctant to provide consumers with that information, or tell people what to do."

### Multi-pronged approach

Bailey says the problem has to be attacked using a multi-pronged approach. "It's not something that can be solved simply by environmental campaign groups, or supermarkets doing labelling, or governments interfering. It needs all of those measures and it also needs to be tailored to the national context. In some countries there may be higher consumer acceptance of taxes on meat, but in other countries tax is almost a swear word. There's no doubt that fewer subsidies and higher prices would reduce meat and dairy consumption."

One promising conclusion from the Chatham House research is that increasing awareness spurs changes in behaviour. "The first thing to do is close the awareness gap. When there's a greater understanding of the impact of livestock emissions, supermarket labelling and other initiatives will have more influence," said Bailey.

Another positive finding was that awareness of the influence of food choice on climate change was highest in the developing countries where demand is forecast to increase the most, including China, India and Brazil. "These nations showed greater consideration of emissions in food choices, and a greater willingness to modify their consumption than western countries. This offers a glimmer of hope," said Bailey.

Vanham also sees education as the way forward. Governments, he says, have a large role to play in educating the next generations about healthy foods. "Arguments about emissions and water are complex matters, but there's a lot of potential to make children at an early certain age more environmentally aware. At my school in the 1980s we never heard anything about it."

Bailey says governments must get over their fears of tackling the problem. Government campaigns in the past have made a clear difference to public health. The best example is the smoking campaigns, which shifted consumer behaviour dramatically. "But they have to get over the fear of being accused of being Nanny State-ish and the fear of a consumer backlash. When the livestock sector is responsible for just under 15% of global emissions it doesn't make any sense not to have any policy, or strategy, for dealing with that," said Bailey.

### You may also like:

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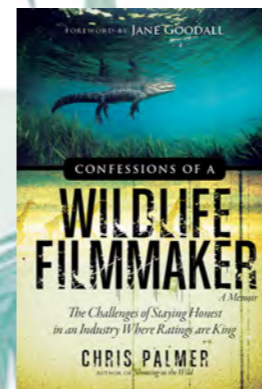
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# Chris Palmer

## AN INSIDER'S ACCOUNT OF WILDLIFE MOVIE MAKING

CHRIS PALMER IS ONE OF THE WORLD'S MOST DISTINGUISHED WILDLIFE FILM PRODUCERS, WINNING TWO EMMYS AND AN OSCAR NOMINATION, AND WORKING WITH A HOST OF HOLLYWOOD STARS. NOW A PROFESSOR OF FILM AT THE AMERICAN UNIVERSITY, HE TELLS DAVID W. SMITH HOW HE FOUND A VOCATION AND WHY WILDLIFE FILMMAKING MUST NOT LOSE ITS ETHICS IN THE HUNT FOR RATINGS.





#### When did your passion for nature develop?

Funnily enough, when I was growing up, I never gave it a thought. In my family we rarely discussed conservation, or the natural world. I write in my new book *Confessions of a Wildlife Filmmaker*, how it evolved into a mission. For a long time, I was floundering and didn't know what to do in life. I was an engineer in the warship design business in the UK, then I got I got into energy policy after I immigrated to the US. But I was trying this and trying that and I finally got into the TV business because I wanted to have more influence on what was going on. I became aware of the interconnectedness of all species and how saving animals can save lots of other things, too, including us. It struck me that having clean air, water and soil, and abundant wildlife were worthy goals to devote one's life to. I wanted to make films that would have an influence and get the right people elected on Capitol Hill.

#### Do you think wildlife films can be influential?

They can make a difference if you think hard about turning them into campaigns and not just entertainments. I made a film back in 1989 with the actor Paul Newman called *Rage Over Trees*, which caused a ruckus and a boycott and headlines in the newspapers. It led directly to the saving of a forest in Portland, Oregon. But too often films are made as entertainments. They appear briefly and then evaporate. Although channels like National Geographic, Discovery, History Channel, Animal Planet and Learning are all run by good, honourable people who teach their kids about the environment and recycling, they get caught up in the politics of institutions driven by ratings. It forces them into behaviours that they won't look back on with any pride.

#### Can you give an example of how that influences the types of documentaries being made?

The Discovery Channel recently produced its so-called *Eaten Alive* episode. They promised that naturalist Paul Rosolie would be eaten by an anaconda armed with a 'snake-proof' suit. Of course, he didn't even go near the animal's jaws. But, worse than the false advertising, was the terrible example of animal-human relations in the programme. The snakes were jumped on, goaded and grabbed. Animal harassment for entertainment is increasingly common on nature reality TV shows and it's deeply unethical. It's an example of a documentary designed to get high ratings, but which has a negative social impact. Egged on by the broadcasters, the filmmakers seek to capture 'money shots' so they will be hired again and can build their careers. My book is a call to arms to persuade the networks that they have responsibilities beyond ratings.

#### Is this unethical behaviour true of the BBC?

The BBC has a long history of being concerned with ethics. They've made mistakes, like everyone, but they are a good example of how to do it properly and are way ahead of their US counterparts. It's partly because they are funded by the licence fee and not advertising, so they chase ratings less. The BBC is not above setting up scenes, however. Even the famous presenter David Attenborough arranged for scorpions to mate in a studio with a painted sunset and Styrofoam clouds as a backdrop.

#### Have you had any hair-raising adventures?

I've had some fantastic experiences, including swimming with dolphins and whales, getting close to Kodiak bears and camping with wolf packs. But the truth is the most dangerous part of my job is the cab ride from my house to the airport. We're very careful when we go into the wild. We don't just wade deep into bear country. We take scientists as advisors and we get all the right injections. One of the key things is to be courteous and respectful when you're around big animals. Basically, you don't do anything stupid.

#### Do you see grounds for optimism about the future of wildlife filmmaking?

We've seen a load of good documentaries about nature in recent years in movie houses. They include Louie Psiyohos' *The Cove* about dolphin hunting practices in Japan and Al Gore's *An Inconvenient Truth*. Psiyohos is making a new film about endangered species. These films stir up argument and are a positive development. But we must remember that not all documentaries are made by progressive people. The National Rifle Association recently made one which would not conform to my personal views...

#### You were also a stand-up comedian for five years? Did you use environmental material?

When I started I used quite a bit of material about wildlife, but over time I cut it down. People reacted better to material about my daughters going on dates, and getting old and decrepit. Everyone can relate to jokes about marriage, love and children. Having said that, I always included a few jokes about wildlife and filmmaking and some went down well. I would get a laugh with jokes like, 'Bears can kill you, so you always go into bear country with someone... that you can outrun'. And 'wear tiny bells to warn bears away. And look out for bear poop, easily recognizable because it contains tiny bells'.

#### Do you see a real passion for the environment among your students?

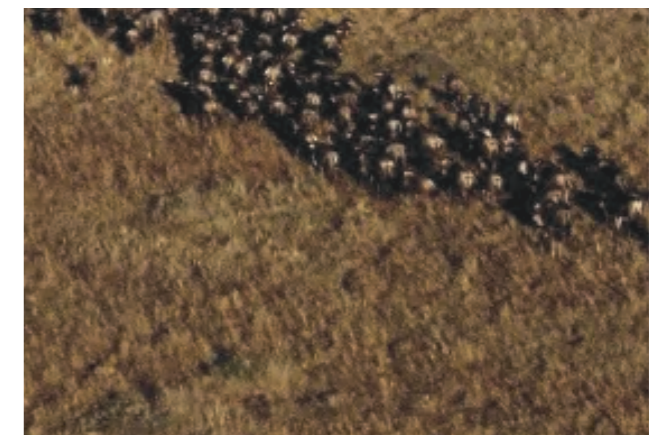
My students care deeply and they want to change the world and do something about climate change. They give me hope. But my optimism is tempered because the world is facing so many dire problems, including ocean acidification, the spread of toxic carcinogenic chemicals and loss of species diversity. My generation - I'm 67 - has left the world in a shameful, embarrassing mess.

#### You eat a plant-based diet? Why did you make that choice?

It's amazing how the world consumes far too much meat and dairy with disastrous effects on the environment. That's because the meat and dairy industries have such a grip on the body politic. But it's a taboo subject and people behave hypocritically. I was hosting an awards ceremony last year where the director of *Titanic*, James Cameron, made a speech about how anyone talking about climate change, but eating meat was hypocritical. He said not eating animals was the best thing we could do for the planet. Everyone nodded and applauded. Then they sat down to eat plates of meat... We may be moving slowly towards a vegetarian diet. More and more of my students are vegetarians. My hope is that in 150 years people will look back on eating meat as we now look back on slavery as absolutely detestable, but who knows?

#### Have you got a piece of advice for someone floundering around as you once were?

Yes, one thing that helped me to find a fulfilling life was to create a personal mission statement in my early twenties. I found it to be a powerful, even transformative mechanism to help me focus. Every few months I go back and fine-tune it. I try to articulate in the most powerful language what I want my life to look like, then I plan my week around it. I need to be organized as I have lots to do - I'm a full-time faculty professor, but I also do a lot of writing and lecturing and I serve on 14 non-profit boards and I run two non-profits. It's a wonderful life and I'm very lucky.





# TOP [50] TECHNOLOGY COMPANIES

SALT'S RANKING OF THE TOP 50 TECHNOLOGY COMPANIES TO WATCH WILL BE AN ANNUAL EVENT. THIS YEAR'S INAUGURAL REFLECTS THE RAPID GROWTH IN NEW FORMS OF DIGITAL TECHNOLOGIES.

## 1. Google

The obvious choice. Their willingness to commit big dollars to long-term research will pay off big for the world. It's just a question of whether it will for the company. Many other firms from the AT&T of yore through Bell Labs, to Comcast, Microsoft, Research in Motion and Nokia have contributed enormous improvements through research, but failed to ever monetize it themselves. But, with the self-driving cars and Google Glass, the company is defining the interfaces that will dominate how we use computers in the future. We'll see if that doubles the size of the company, or simply feeds the next generation of startups.



## 2. Microsoft

Largely dismissed for the shinier Apple, Microsoft continues to grow revenues and maintain dominance of the business computing world. Their unparalleled ability to sell to large enterprises allows them to play catch-up in strategic areas like Smartphones and tablets — though they've hung back too long in both by many estimates. Where they do lead is in gaming, where the Kinect is an unparalleled advance in speech recognition and motion tracking, and shows hints at what the next generation of PCs should be able to do. With billions in cash minted every year, the company also has the means to make big moves.

## 3. Sony

The meandering Japanese electronics manufacturer has found its mojo again. The company is regaining share in televisions, game consoles, and other smart home devices. That puts them in competition with Google and Microsoft, and often between those companies and their customers, literally. The company has a chance now, with its footprint in the living room, to once again become the dominant force in entertainment technology. Can they manage to position themselves as the alternative to the style and entertainment kings at Apple, a company whose products have surged in the market place in the last few months due to last years launch of the iPhone 5 and 6?



## 4. Trimble Navigation

A company most have never heard of is putting much of the research done by the companies above into practice in staid industries like farming and construction. Trimble offers autonomous driving systems for tractors, for instance, which can run more precisely than any human operator and do so 24 hours a day. They employ advanced computer vision systems to dramatically reduce the use of pesticides, spraying only when the tools "see" an invasive plant. Led by former HP researchers, it is the type

of crossover company that Google risks spinning out of its own efforts — a multi-billion dollar market transformer, missed out on by the part of Silicon Valley that prefers not to play in the dirt.



## 5. Isis Pharmaceuticals and the entire biotechnology field

Biotech has been big for investors of late, thanks to a handful of blockbuster drug approvals that catapulted the once cutting edge to the forefront of the US\$750 billion annual drug industry. However, it is a change that has only barely started. The real biotech revolution will come in the form of customized, genetic, proteomic, lipidomic and similar treatments for the previously untreatable diseases. Isis is the poster child for this potential, with its 'antisense' technology, a temporary genetic off switch. One such drug, Kynamro, is already used to treat extreme high cholesterol in those genetically predisposed to it — and shows promise of bringing the same amazing results to much broader populations next. For them, it's one of dozens of such promising programmes in development. And, there are literally thousands of other small companies building the next generation of drugs. Big Pharma's famed "patent cliff" is much bigger than that. It is a fundamental change in the way we discover and design medical treatments, which is leaving the old guard behind.

it took things to a whole new level with the iPhone 6. Most of these products were modifications to existing lines, but CEO Tim Cook says the company is working on several products in new categories. Cook also believes the Mac is well-poised to take advantage of the mass desertion of the PC.

## 7. General Electric

GE will invest more than US\$15 billion in innovation by the end of 2015. Its eight R&D labs around the world employ more than 3,000 scientists and engineers. GE Global Research is always on the lookout for new ideas and sponsors competitions, such as a recent 3D printing challenge, that attracted worldwide participation. GE is now also using big data to analyse the performance of its own machines. The company says smart use of data can boost US productivity by 1.5% a year.



## 6. Apple

After much talk about a slowdown in Apple's sales, They recently announced record profits. Apple remains a giant of innovation. Over the last couple of years, it's brought out the iPad Air, the iPad Mini with Retina display, Mavericks, iOS 7 and iTunes Radio. It also brought out two new phones concurrently — the iPhone 5C and the iPhone 5S — for the first time ever. Then



## 8. Medtronic

The world's fourth largest medical device company, Medtronic, is headquartered in Minneapolis, but services 140 countries. It has made its name through designing miniature implants for the human body. Its pacemakers have gradually shrunk since the 1950s, and it is now working on a pacemaker the size of a vitamin capsule which could be inserted into the leg through a tube and directed up to the heart.

## 9. Tesla Motors

The California electric car manufacturer posted profits for the first time in the first quarter of 2013 after 10 years in existence, but Tesla Motors is so confident about its future that it plans to build a US\$5 billion gigafactory by 2020, to produce affordable cars on a mass scale. Right now, the cost of a Tesla Model S is beyond the reach of most drivers, although the quality justifies the price-tag. Tesla designs its own batteries

and other electric components and the car's range is about triple the distance of Nissan's rival Leaf electric car. Tesla also plans to build a nationwide network of charging stations that can deliver 200 miles of charge in about half an hour. Currently that takes several hours.

### 10. Novartis

Since deciding to focus R&D on rare diseases and biotech, the Swiss pharmaceutical company has been a giant of innovation. The Novartis research network spans much of the globe, with the Basel laboratory as the focal point. A former industrial production site, Novartis transformed it by getting rid of walls and cubicles to create "the lab of the future", where informatics, bioinformatics and communication tools are integrated.

### 11. IBM

IBM's research arm invests US\$6-8 billion annually on R&D and employs 8,000 inventors in 41 countries. In 2013, it received 6,809 patents, exceeding the combined total of Amazon, Google, EMC, HP, Intel, Oracle/SUN and Symantec. In 2014, that number rose to 7,534. A diverse range of inventions emerged, especially in the cloud, Big Data and analytics. These ideas will advance the age of cognitive systems where machines interact more naturally with people.

### 12. BGI

China's BGI (Beijing Genomics Institute) is a world leader in gene-sequencing for human genomes, but also animals and plants. It wants to be the first to create a process for sequencing an individual's DNA and strengthened its position in 2013 by acquiring California's Complete Genomics for US\$118 million. Together, the companies can sequence 80% of human genomes. BGI's rival, Illumina, global leader in gene-sequencing machines, opposed the bid. Through affiliates BGI Americas and BGI Europe, it is strategically placed in the West.

### 13. Medivation

US biopharmaceutical company Medivation develops novel therapies to treat serious diseases. In 2014 its Xtandi treatment for prostate cancer reached blockbuster status with sales of more than US\$1 billion. Co-developed with Japan's Astellas, Xtandi's sales should increase with the European roll-out.

### 14. iRobot

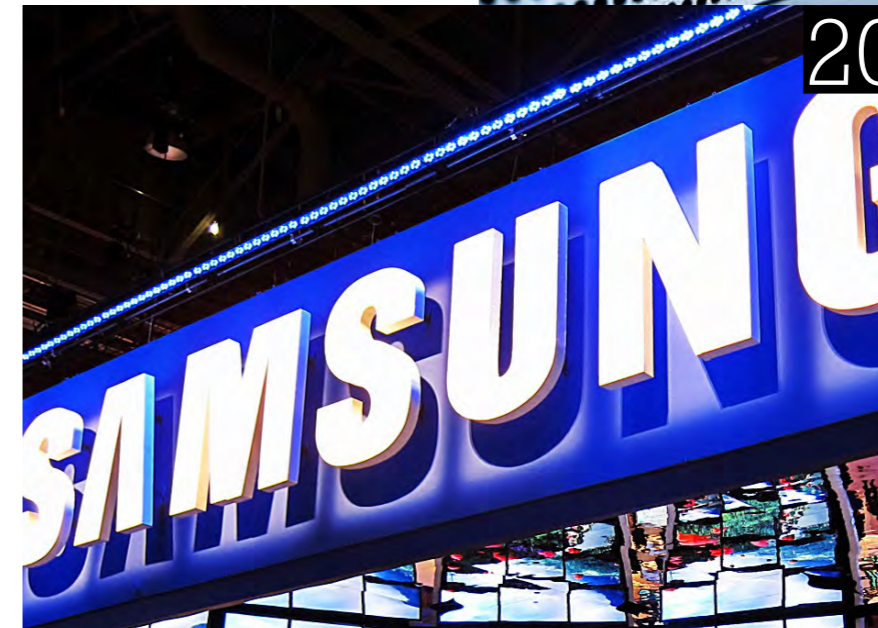
Massachusetts-based company iRobot has sold millions of consumer robots, many of them Roomba vacuum cleaners, and its PackBot bomb-disposal units have been used in Iraq and Afghanistan. The company leads the way in robot technology by focusing on three areas of improvement – navigation, picking things up and perception.

### 15. Philips

The electronics giant recently introduced an innovative range of wireless LED lamps, including 3D-printed luminaires. With an eye to the future, Philips has been reducing its portfolio of consumer electronics and moving more towards personal health and wellbeing products.

### 16. Foxconn Technology Group

Taiwan's Foxconn is the major supplier of iPhone and iPad products. Other notable designs include BlackBerry, Kindle, Xbox and PlayStation. Foxconn wants to manufacture to the US to open up more prospects for business with Apple. It is also prioritizing investment in Indonesia, which it sees as a manufacturing hub in the future. Foxconn's colossal size – it has more than a million employees – allows it to negotiate cheaper component prices.



### 17. Abbott laboratories

The US pharmaceuticals and healthcare giant has 90,000 employees and operates in more than 130 countries. Its treatments for diabetes, arthritis, HIV and other major illnesses are world-renowned. Abbott is continually looking for new approaches in four core businesses – diagnostics, medical devices, nutrition and pharmaceuticals. Abbott partners academics, nonprofits, governments and private companies to combat the world's most pressing health challenges.

### 18. Texas Instruments

Dallas-based TI is the world's third biggest manufacturer of semiconductors, the second largest supplier of chips for mobile phones and the largest producer of digital signal processors. TI's important innovations include commercial silicon transistors, integrated circuits and electronic hand-held calculators. The tradition of innovation lives on. Today, TI's semi-conductors are enabling the design of automated cars.

### 19. Amazon

Amazon caught the attention with its promise to create drones that deliver packages. Doubts remain over the cost feasibility of delivering small items in such a way and over safety issues. But Amazon has many other new ideas. Most profits are ploughed into research at the secretive 'Lab 126', where engineers design the next-generation Kindles and other devices. Amazon also spends a great deal on developing the most technologically advanced warehouses. The company has more than 1,200 patents and strives to stay ahead through innovation.

### 20. Samsung

South Korea's Samsung has been one of the dominant forces in smartphone innovation. Back in 2013, the Galaxy S4 smartphone impressed with new features like eye-tracking technology. In summer 2013, Samsung released a curved TV based on Organic Light-Emitting Diode (OLED)

technology. Best of all, Samsung beat arch rivals Apple, Google and Microsoft in the race to release a smartwatch – the futuristic Galaxy Gear. In 2014, the innovation continued with the Galaxy Note 4 phablet with fingerprint scanning and handwriting recognition, plus the Note Edge phablet, with its curved display that goes around the right-hand edge.

### 21. Illumina

San Diego-based Illumina has become the leading US innovator in the genome-sequencing business, a market ready to explode into life. Illumina's next-generation sequencing (NGS) enables researchers to study biological systems at a much greater capacity than traditional DNA sequencing technologies. The cost of deploying the technology has plummeted from close to US\$1 billion to a few thousand dollars. The implications for medical research are huge. NGS will usher in an era of personalized medicine and Illumina will be the major supplier for testing equipment.

### 22. Broadcom

California-based Broadcom boasts that 99.98% of data crosses one of its chips. The technology is in products as diverse as microwave transmitters, wide area network switches, cellular baseband equipment, mobile phones and tablets. Being strong in the Wi-Fi and Bluetooth technology market, it is perfectly placed to grow as the number of connected devices increases from 2.5 billion in 2009 to a projected 30 billion in 2020. In its relentless quest for innovation, Broadcom has bought out more than 60 companies since 1961, many of them start-ups in Israel

### 23. InvenSense

There's a lot of excitement around the wearable device industry, but the market is at an early stage. There's little doubt demand will accelerate in the next few years and InvenSense will be a big player. The company designs micro-electro-mechanical-system (MEMS) gyroscopes and tiny accelerometers used in motion-tracking devices in consumer electronics. InvenSense products are found in Nintendo Wii gaming consoles, smartphones and tablets. These chip-based sensors make wearable and connected devices function. The InvenSense SoC technology will be at the heart of the tech revolution.

### 24. LG

Samsung's Korean rival showcased eight new mobile phones at the 2014 Mobile World Congress, including the G Pro 2, G Flex, G2 mini, F70, F Series and L Series. That was the beginning of a renewed push in the market. Its new products earned it the title of Most Innovative Device Manufacturer of the Year for 2014. The LG G3 won awards for its sleek design with the buttons at the rear, a great camera great and a special screen. Perhaps its most innovative phone is the bendable and unbreakable G Flex with its curved screen. LG says the panel is the thinnest and lightest of any smartphone. It is working on curved designs for consumer electronics and has plans to market a smartwatch which connects to rival manufacturers' phones.

### 25. Oculus VR

Whilst a lot of prototypes of virtual reality headsets for gaming have been disappointing, the Oculus Rift products have received rave reviews. The units are not being sold yet, but the company has secured US\$91 million in investment. The consumer version should be available some time in 2015.



### 26. Equinix

California-based Equinix dominates the data centre market with more than 90% of the peer IP traffic of global internet routes. Platform Equinix serves more than 4,000 businesses worldwide ranging from financial institutions to telecom operators using 100 neutral data centres in 15 countries. Executive Chairman Peter Van Camp has described the Equinix Internet Exchanges (IBXs) as "international airports where passengers from many different airlines make connections to get to their final destinations". Demand for Equinix services has rocketed and given the tremendous growth of the global data centre, the company is poised to expand rapidly.

### 27. Netflix

Netflix reinvented how we rent movies. But once on-demand streaming became available, their stock fell dramatically in 2012. Netflix, however, rebounded in 2013, attracting millions of new subscribers. Since then, it's gone from strength to strength. With more than 40 million customers and an aggressive overseas expansion plan, Netflix will remain a force. It is determined not to stand still. It has had great success with developing exclusive web-based content and has floated the idea of paying for movies that open in cinemas and online on the same day.

### 28. Canon

Japanese tech giant Canon is a household name for its cameras, but is also the world's leading supplier of copying machines, laser printers and paper management systems. Regular innovation has maintained continuous growth since 2007 and it received 3,825 US patents in 2013, the most for a Japanese company. This was followed by 4,055 in 2014. Only IBM and Samsung had more. Much of Canon's R&D is now focusing on optical technology and imaging.

## DIGITAL DEVICES AND GENE RESEARCH TRANSFORM TECH WORLD

THE EXPLOSION IN NEW DIGITAL GADGETS AND THE RAPID ADVANCES IN GENETIC KNOWLEDGE HAVE REMODELLED THE LANDSCAPE FOR TECH COMPANIES.

The last few years have seen a shift in the technology world that analysts have been predicting for over a decade. Fuelled by universal connection to the internet, there has been an explosion in new digital devices which has revolutionized both social interaction and business.

Alex Daley, a senior editor of Casey Extraordinary Technology, said: "More than three billion people worldwide are linked to the internet. We have Wifi in almost every connected household and multiple devices connected at the same time. As a result, we've seen a massive expansion of digital devices designed just for the consumption of video, or just for books. It's greatly increased the amount of time in a day that computers are part of our lives. My new Xbox One brings together a lot of these visions we've been promised for 20 years, including voice recognition and interaction. Computers are learning to change their behaviour based on our moods."

Many of the most dynamic companies are in the information technology sector. "New devices have driven the need for different operating systems which are custom-designed to work with the new hardware. That's created a boom of services, delivery methods, of everything," Daley said. "The web has been pushed to a back seat and the native app has become the big thing. Meanwhile, traditional computing – sitting down with a desktop, keyboard and mouse to crunch information and edit spreadsheets – is a slower growth model."

With the quantity of data doubling every nine months, companies able to use machine intelligence to analyse Big Data are thriving. The cheap cost of starting these businesses makes them a tempting target for venture capitalists looking for quick returns on investment. "We can create more of a soup of data, as opposed to an organized data stream, and use machine intelligence to gain insight without experts managing it manually," said Daley.

Similarly, the intelligence of algorithms is creating growth in automation technologies. "The rise of robots two decades ago provoked fears they would take every blue-collar job. Obviously they've eaten into them, but the first generation of robots were immobile and stupid. They could do one thing well, but lacked real intelligence, vision and mobility. All of these inference-based algorithms have advanced phenomenally over the last few decades," he said.

Another big change in the technology field is in the area of genetic knowledge in the biotechnology field, Daley says. "We're seeing a huge increase in access to molecular testing for signs of genetic markers in individual diseases. It's an exploding market driven by the demand for biological compounds and the tools we've built in the drive to find biological drugs. The past couple of years have seen marketable technologies for molecularly targeted cancer treatments and the first antisense drugs which block genetic behaviour in a way that is temporary and reversible."



### 29. Ericsson

The Swedish company has created a joint innovation lab with Facebook called the Internet.org Innovation Lab. It opened in the second half of 2014 on Facebook's campus in Menlo Park, California, and aims to find a way to make internet access available to all. Ericsson provides the ability to simulate different network environments, allowing developers to test mobile applications and services.

### 30. Qualcomm

Qualcomm is by far the biggest provider of mobile phone chips and has passed Intel Corp as the largest semiconductor company by market value. Qualcomm is a major supplier to Smartphone leaders Apple and Samsung and gets royalties for every 3G and 4G device sold. It is also busy improving wireless standards so mobile networks can handle more data.

### 31. Dropbox

Dropbox was the first company to get close to perfecting cloud file storage and now has close to 200 million users and an estimated US\$10 billion valuation. Around one in seven adults in the US are using online storage service and Dropbox has the largest market share, followed by Apple's iCloud. Dropbox claims more business customers than Huddle, or Box. Its customers praise Dropbox's tools as being the easiest to use. The company is attracting some of the best engineers and more innovations will follow.

### 32. ARM Holdings

The British tech giant has expanded in tandem with smartphones. Although not a household name, ARM produces a microprocessor found in six billion mobile phones. The smartphone market is unpredictable, but ARM says there's a lot of growth in other products, such as wearable technology and products for the 'internet of things'. Two new items are a smartwatch synchronised to mobiles and a Fitbit which tracks physical activity.

### 33. CloudFlare

The security and website optimization service provider grew by 400% in 2013. The growth continued at a slightly slower pace in 2014. Although not a household name, the San Francisco-based company handles 5% of global web traffic. More than just a content delivery network, it optimizes huge chunks of the web for delivery, screenings out hackers and providing analytics. China is CloudFlare's second largest market, and Brazil its third. It is now adding data centres in Latin America, the Middle East, Africa, and parts of Asia.

### 34. Shazam

Founded in 2000, the British app is one of the 10 most downloaded apps for the iPhone. It allows Smartphone users to identify music on TV and the radio. The Shazam app has more than 100 million monthly active users and has been used on more than 500 million mobile devices. In October of 2014, Shazam announced its technology has been used to identify 15 billion songs. If users download the music, Shazam gets a small cut.

### 35. Baidu

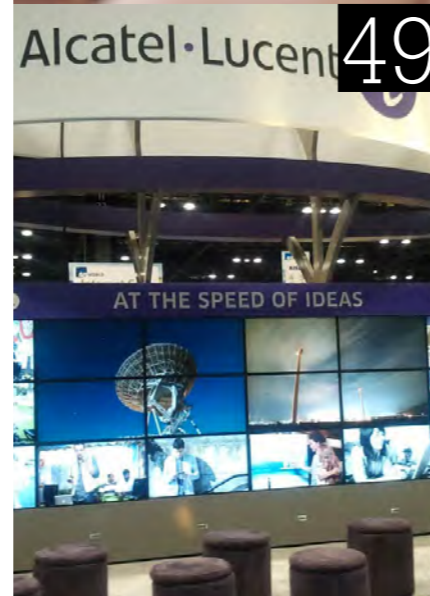
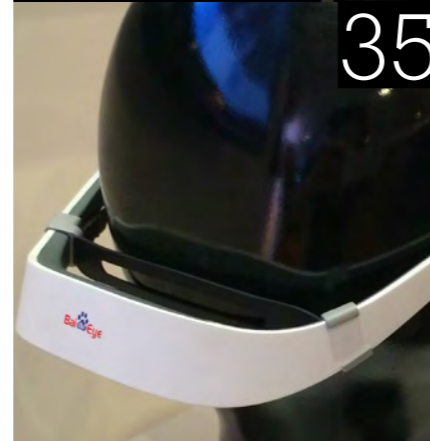
The 'Google of China' has a 60% share of the country's search engine market, even though competitors like Sogou and Soso have eaten into its market share. Baidu's founder Robin Li called on employees two years ago to demonstrate "wolf spirit", meaning taking risks and innovating. His call has been heeded. The company has invested heavily in development and begun to move from software into hardware with new brand Xiaodu. For example, it has launched a Wi-Fi-controlled camera called Xiaodu iErmu, which records streaming video and stores it in the cloud.

### 36. Ayasdi

California start-up Ayasdi has made a big impression in Big Data analysis since launching in January 2013. The company has produced breakthrough work revealing genetic traits of cancer survivors, tracing the source of an E. coli outbreak, and helping the Institute for the Study of War discover patterns in terrorist behaviour in Iraq. It has raised US\$30.6 million in funding from high-profile investors, including General Electric and Citi. These giants are intrigued by Ayasdi's unique method, which uses advanced mathematics, statistics and machine learning to discover information from data automatically. Ayasdi likes to say it gives answers to questions you didn't know you had.

### 37. Xiaomi

A start-up in 2010, Xiaomi leapfrogged more established rivals such as Lenovo thanks to aggressively priced budget smartphones. It sold more than 20 million in 2013 to become China's second-largest Android phone seller behind Samsung. Rather than ripping off rivals, Xiaomi develops its own brands and designs, giving it enough credibility to attract Hugo Barra, a former head of product management at Google's Android mobile unit. Barra says the company will one day be as big as Google and Apple. The explosion in sales in 2014 suggests he may be right. Xiaomi now accounts for 38% of total mobile phone sales and 47.5% of smartphones.



### 38. iHub

Nairobi's iHub is an innovation hub and hacker space for the technology community. The iHub has built an ecosystem to benefit Kenyan entrepreneurs, investors and tech companies. One of Africa's most successful companies, it has grown 500% since 2010. The key is Open Innovation – the art of combining both internal and external ideas and paths to market.

### 39. FitBit

The San Francisco-based company manufactures fitness trackers, a hot area of technology with great potential for innovation. A wealth of functionality is possible. In five to 10 years, there could be FitBit products customised to medical needs, alongside recreational devices and data-oriented ones. FitBit's designers also envision that one day their products could be married to smart watches.

### 40. Altera

As broadcasters look to make live 4K video mainstream, equipment makers are searching for new ways to handle technical issues, as well as lower costs. Altera's technological innovations solve a lot of the complex problems. The Silicon Valley manufacturer is also a leader in the manufacture of PLDs and reconfigurable complex digital circuits.

### 41. Symantec

Founded in 1982, Symantec is an information protection expert that helps individuals, businesses and governments to secure their data. Although its Norton products are household names, two thirds of revenue comes from selling enterprise software to companies and large organizations. Ninety-nine percent of Fortune 500 companies are Symantec customers. Its 20,000 employees work in more than 50 countries.

### 42. GitHub

San Francisco's social network GitHub is not for sharing photos and pleasantries. Dubbed "Facebook for geeks", it is a place where software developers can store, share, and update projects in computer languages such as Java and Python. With close to four million users worldwide, GitHub facilitates innovation beyond the restrictions of geography, or established companies.

### 43. Snapchat

Snapchat is a mobile service that allows users to send pictures and videos that self-destruct after a short time. Senders set the time limit of between one and 10 seconds. Since two Stanford students launched it in September 2011, Snapchat has been one of the fastest growing apps. In November, the company turned down a US\$3 billion cash offer from Facebook. The messaging app had been valued at US\$10 billion, so perhaps we should not be surprised.

### 44. Line

Line is Japan's largest social network and competes globally with messaging apps like WhatsApp and China's WeChat. From its launch in 2011, Line has accumulated 300 million registered users. In Japan, it dominates the market with 50 million users and has become a major force in the gaming market. Line initiated the trend for 'stickers' – copied by Facebook and Path. The US remains tough to crack, but Line is looking to Taiwan, Thailand and Latin America for more customers.

### 45. ZipDial

In India, people often communicate by calling briefly, then hanging up so they don't use pre-paid minutes. The call might mean "call me back", or "I've arrived safely". Indian company ZipDial has found a way to monetize the habit. It gives special numbers to companies to print on ads. Consumers call the numbers and then get a text, or call, in return. ZipDial sees huge potential for growth in other Asian nations, such as Sri Lanka and Bangladesh, and in South East Asia. Earlier this year, Twitter announced the acquisition of ZipDial.

### 46. PTC

The McKinsey Global Institute says the Internet of Things (IoT) will have an economic impact of US\$2.7 trillion to US\$6.2 trillion annually by 2025 by which time 80% to 100% of all manufacturing could be using IoT applications. The Massachusetts technology company positioned itself to profit from this growth market by acquiring ThingWorx – creators of an award-winning platform for IoT apps – for US\$112 million at the end of 2013. In 2014, its expansion continued with the acquisition of Axeda Corporation, a developer of solutions that securely connect machines and sensors to the cloud.

### 47. Acuity Brands

North America's leading lighting company, Acuity Brands sells lighting controls with nearly all its LED lights. Embedding smart digital systems into lights means, for example, that outdoor spaces are not lit when not in use. In the energy-conscious modern world, this gives the company more potential for growth than rival Cree, more of a pure LED player. Controls make anything from a car park to an entire university campus more energy-efficient.

### 48. XL Hybrids

XL Hybrids is developing technologies to transform our energy future. Its XL3 hybrid electric drive system meets sustainability goals by increasing miles driven per gallon by 25% and reducing fuel use and carbon dioxide emissions by 20%. For new Class 1 to 4 commercial fleets, the system is installed in just five hours. Customers include Coca-Cola and FedEx.

### 49. Alcatel-Lucent

The French company telecommunications giant has operations in 130 countries, but after seven years of negative cash flows, is cutting 10,000 employees from its 72,000 workforce. Alcatel-Lucent's inventiveness, however, is not in doubt. At Bell Laboratories, its R&D subsidiary in New Jersey, researchers have developed radio astronomy, the transistor, the laser, the charge-coupled device (CCD), information theory, the UNIX operating system, and various programming languages. Bell Labs has won seven Nobel Prizes and the company holds more than 29,000 patents.

### 50. Box

Sales at the enterprise cloud-based storage company grew by 150% in 2013. Box now has 14% share in the overall market, behind Dropbox, with 27% and Microsoft with 17%. The core is based on sharing, collaborating, and working with uploaded files. Three accounts – enterprise, business and personal – are available. Depending on the account, Box offers unlimited storage, custom branding and administrative controls. Box made its trading debut in January this year and raised US\$175 million on its initial public offering.

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Robert Howarth,  
Cornell University

FRACKING SLOWDOWN:

A SHOT IN THE ARM FOR

# RENEWABLES



CONTROVERSY OVER THE RELEASE OF METHANE GASES, POTENTIAL THREATS TO HEALTH AND THE **FALLING PRICE OF OIL** ALL THREATEN TO UNDERMINE THE FRACKING INDUSTRY. AS PRICES FALL, THE ARGUMENTS FOR RENEWABLES COULD BECOME OVERWHELMING

By David Rogers



**JACKSON SAID:** WHEN WE TALK ABOUT BANS, IT'S NOT GREENHOUSE GAS, IT'S HEALTH THAT MAKES THE DIFFERENCE. THAT'S WHY THE **WATER ISSUE** IS SO IMPORTANT, AND THE EMISSION OF VOLATILE ORGANIC COMPOUNDS FROM WELLHEADS. THERE HAVE BEEN NO HUMAN HEALTH STUDIES. THERE HAVE BEEN A HANDFUL OF EXPOSURE STUDIES, BUT EVEN IN THE US WE HAVE NO HEALTH STUDIES AND ABSOLUTELY NO LONG-TERM HEALTH STUDIES.

here is a strong possibility that only three or four years after it began, the shale gas revolution is in serious difficulties. The reason is that a number of commercial, environmental, geological, political and geopolitical factors have combined to cast doubt into many minds as to the desirability and viability of fracking. And one of the US's largest and most influential states – New York – has banned it altogether. If this is so, then it may be good news for renewable technology, which appeared to be in danger of being forced out of the marketplace by the tsunami of abundant hydrocarbons. And if the practice does decline, then that will naturally take supply out of the market and promote the rise of oil prices to the point where renewables make sense economically as well as environmentally.

In his fifth State of the Union address last January, Barack Obama once more gave the presidential seal of approval to the extraction of oil and gas from shale beds using hydraulic fracturing, or fracking for short. The benefits, he said, were many and great: the sudden access to clean shale gas had been one of the principal causes of restarting the US economy after the 2008 slump. It had brought America “closer to energy independence than we’ve been in decades”, and was encouraging businesses to invest “almost US\$100 billion in factories that use natural gas”. In the future, fuelling stations would be built to “shift more cars and trucks from foreign oil to American natural gas”. It would, he said, be the “bridge fuel” that would replace coal and allow low-carbon growth to take place while renewable sources of energy were being perfected.

Previous speeches had been even more enthusiastic. Back in March 2011, when the fracking industry was still in short trousers, he told an audience at Georgetown University that: “Recent recent innovations have given us the opportunity to tap large reserves – perhaps a century’s worth of reserves – in the shale under our feet”. And in his 2012 State of the Union address he stated baldly: “We have a supply of natural gas that can last America nearly 100 years.”

The excitement was understandable. In 2000, shale gas made up 1% of US natural gas production; 10 years later it was more than 20% and the Energy Information Administration (EIA) predicts predicted that by 2035, 46% of America’s natural gas will come from fracking. As of now, two million wells have been sunk, and 19 out of every 20 new boreholes are for hydraulic fracturing.

And yet, despite the wholehearted support from the Obama administration and these astonishing statistics, all may not be as it seems.

**How “clean” is shale gas?**

One of the principal arguments advanced by Obama is that shale gas can replace coal while the US ramps up the production and deployment of wind and solar power. This argument is certainly plausible – the UK made a similar “dash for gas” at the beginning of the nineties and claimed that it was decarbonizing energy generation – but a growing number of scientists have recently cast doubt on it.

The first of them was Robert Howarth, a professor of ecology at Cornell University. He published a paper in April 2011 arguing that shale gas actually had a greater effect on global warming than natural gas and other fossil fuels.

He told Salt: “We focused on methane emissions, because natural or shale gas is mostly methane and methane is an incredibly potent greenhouse gas. People sit there going, ‘well, the carbon dioxide emissions are a lot less than coal’, and that’s perfectly true, but the methane is much higher than coal. We did the best job we could of estimating what those methane emissions were. It was hardly rocket science, but nobody had done it before.”

The consequences of Howarth’s paper were spectacular. Usually, he says, a high-visibility paper will generate follow-up research over the course of five to 10 years. “In this case, my paper came out in 2011 and probably 10 others were published in the next eight months that re-analyzed our approach. A lot of other scientists got interested in the controversy so there was a huge increase in people going out and getting new primary data. Studies published in the past year say that we were probably right but that we were a little too conservative: things are worse with shale gas. There are certainly people who still disagree with me, but I would say that of people who work in this area 75% agree and 25% disagree.”

However, the most spectacular result was when Howarth’s research was used by France’s parliament when it voted to impose a nationwide ban on fracking. “The French parliament

used it as a major part of its decision making, says Howarth, “and they did consult with me to make sure that they understood what I was saying.”

**A bridge too far?**

Other scientists are more sympathetic to the bridge fuel argument. Robert Jackson, an earth sciences professor at Stanford University, said: “The US\$10 billion greenhouse gas question is the extent to which shale gas reduces coal use compared with how much

I'M A CO-CHAIR OF GLOBAL CARBON PROJECT, AND AT CURRENT RATES WE ARE ONLY 20 OR 30 YEARS AWAY FROM OVERTOPPING THE 2°C THRESHOLD AND REALLY WE'RE ON A TRAJECTORY TO REACH 3-5° THIS CENTURY UNLESS THINGS CHANGE RADICALLY.

**Robert Jackson, Stanford University**

it reduces renewables. When people say ‘bridge’, do they mean 25 years, 50 years or 100 years? I think the main factor is how quickly the cost of renewables drops – we will realize that wind and solar are as cheap, or cheaper, than shale gas, use less water and produce less pollution, so the argument for renewables will be unanswerable. But, meanwhile, we’re hurtling towards temperatures that are much higher than anybody thinks is safe because of the rise of emissions in China and India and the lack of action in places like the US.

“If we couple natural gas to renewables in the short term, I think it can make an important contribution. I think a 25-year timeframe is reasonable. I’m a co-chair of the Global Carbon Project, and at current rates we are only 20 or 30 years away from overtopping the 2°C threshold, and really we’re on a trajectory to reach 3-5° this century unless things change radically.”

**The geology**

Why have companies found it necessary to drill two million wells in the US? The answer to this question indicates another peculiarity of the shale gas industry: There are a lot of unproductive wells, and the ones that are productive have a much faster decline curve than their conventional counterparts. In December last year, Nature magazine cast doubt on Obama’s century of cheap gas claim, and the view of Adam Sieminski, the director of the EIA, that “there is no doubt at all that production can continue to grow all the way out to 2040”.

Tad Patzek, the head of the University of Texas’ department of petroleum, told Nature that the drive to extract shale gas as fast as

possible and export it to the rest of the world meant “we’re setting ourselves up for a major fiasco”. Most of the EIA’s projections were based on the assumption that fracked wells have the same 20-year decline curve as conventional gas, but with shale gas, 90% is gone in the first 18 to 24 months.

Howarth said: “The new studies that have come out are pretty convincing, and although we have increased our natural gas supply short term we can keep it going only for another decade, maybe two; for the oil, a lot of people are saying that those fields are peaking already. The idea that we might have 100 years of gas, as Obama said in his State of the Union address, is simply not true. The data didn’t support that at the time. It’s been terrifying for me to watch because you’d like to have a national energy policy that’s based on data. I know they’re political decisions, but they have to start with the facts and if you get the facts wrong then they can lead to disaster.”

**Health and safety**

If the scientific evidence is troubling with respect to the effect of shale gas on global warming and on the amount of gas and oil that can be extracted, at least these two factors cancel each other out, to some extent. What is equally troubling is the absence of evidence on the effect of fracking on human health. And although France made its decision on the basis of climate change, most other regulators will be more influenced by this question.

Jackson said: “When we talk about bans, it’s not greenhouse gas, it’s health that makes the difference. That’s why the water issue is so important, and the emission of volatile organic compounds



from wellheads. There have been no human health studies. There have been a handful of exposure studies, but even in the US we have no health studies and absolutely no long-term health studies."

He points out that the decision to ban fracking in New York state, despite the presence of substantial gas bearing shale, was taken by the health department of the state government. "It's not surprising that a health department would look at the lack of data and say 'we need more time'."

Jackson said: "What's different about hydraulic fracturing is that it's an intensive industrial process that happens in thousands and thousands of places and every one is a potential mistake and a potential battleground, even though in many cases it goes perfectly well and people are happy with how it's gone. But I have some photographs showing the close proximity of houses and these industrial fracking operations in Pennsylvania and Fort Worth."

Data collected by Jackson's researchers suggest that up to 10% of wellpads have serious air emissions and water problems. Although this might be regarded as a reasonable failure rate, the fact that fracking involves so many wells so close to where people live means that the total number of problems is large.

#### The business case

The final problem with fracking is that it relies on oil being relatively expensive most of the time. One of the largest shale oil fields in North America is the Bakken in North Dakota, and one company, Continental Resources, owns the mineral rights for about one million acres of the state. However, with oil prices at US\$60 a barrel, about 70% of its wells operate at a loss, according to an analyst's note from ITC Investment Research.

This has led to much speculation that Saudi Arabia is using the cheap oil weapon to force companies like Continental out of business. If so, the real targets are those who invest in fracking: all those wells and that extraordinary expansion requires immense investment predicated on the assumption that over time, energy prices can only rise. If the Saudis can create a credible threat that prices may remain low for years at a time, hydraulic fracturing will look like a risky bet. In other words, the perception has been created that even if oil prices do recover to a level that makes fracking profitable, they could be forced back down in the future. So much for America's energy independence ...

#### Is it all over?

The decision to ban fracking in New York will probably have some effect on international opinion, but according to Cornell's Howarth, it will not influence oil states like California, Texas and Oklahoma that think they understand the oil industry. Fracking will probably continue in these areas at a reduced rate, and scientists such as Stanford's Jackson argue that this is not such a bad thing, as long as companies are sufficiently well regulated, best practice is followed, wells are monitored, research conducted and problem companies identified. At the same time, he says, measures should be put in place to aggressively promote renewables – ideally involving some way of charging for carbon.

It will also not prevent some nations from going ahead: China and Argentina, for example, have advanced plans to exploit their immense deposits of shale. However, what is clear is that the dream of turning the clock back to the 1920s and reliving the golden years of the oil industry is over. □

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## EUROPEAN ATTITUDES TO FRACKING

IN THE US, GROUNDBREAKING RESEARCHERS AT JOHN HOPKINS APPLIED PHYSICS LABORATORY UNIVERSITY HAVE PROVIDED A DOUBLE-AMPUTEE FROM COLORADO MAN WITH TWO MIND-CONTROLLED LIMBS. LES BAUGH, WHO LOST BOTH ARMS IN AN ELECTRICAL ACCIDENT 40 YEARS AGO, IS ABLE TO CONTROL THE BIONIC LIMBS SIMPLY BY THINKING ABOUT MOVING THEM

In Europe, there are widely divergent policies on fracking with some governments in favour and others against. The French declared a strict moratorium in 2011, whereas the British Government has loudly promoted drilling for shale gas as a way of weaning the UK off Russian imports.

The most ambiguous response has come from Germany, where the Government has relaxed its original ban on commercial fracking. German authorities now plan to allow exploratory commercial drilling starting in 2019 at depths of less than 3,000 metres. The Government has assured the German public – which is largely opposed to fracking – that any drilling with will be done according to "strict" environmental limits.

Franciso Szekely, a Professor of Leadership and Sustainability at Swiss business school IMD, opposed the German decision to lift the ban to reduce the country's dependency on gas imports from Russia. "It's not a sustainable solution. The temporary relief of geopolitics should not be achieved at the long-term cost of environmental degradation. To put our economy and our world on a path to sustainability, governments and companies need to focus on doing real good for society," he said.

Szekely said fracking in Europe would provide short-term economic benefits at best, but governments needed to find new ways of thinking. He quoted Albert Einstein's dictum that "We cannot solve problems by using the same kind of thinking we used when we created them".

ALTHOUGH NATURAL GAS HAS COME TO BE SEEN AS AN IDEAL FORM OF CLEAN ENERGY, THE UNBURNED METHANE GAS THAT ESCAPES DURING THE FRACKING PROCESS CAN POLLUTE THE ENVIRONMENT MUCH MORE THAN CONVENTIONAL ENERGY SOURCES SUCH AS COAL AND OIL. ACCORDING TO STUDIES CARRIED OUT IN COLORADO, 3% OR MORE OF NATURAL GAS CAN LEAK DURING THE DRILLING PROCESS FOR SHALE GAS. THIS GAS IS 80 TIMES MORE TOXIC TO THE ENVIRONMENT THAN COAL.

**GILES GROSSE**  
CSR EXPLORER



*Today's businesses must become the self-generating generation*

BUSINESSES THAT GENERATE ELECTRICITY CAN PROTECT THEMSELVES FROM THE INCREASINGLY COMMON POWER SHORTAGES, AS WELL AS MAKING MONEY FROM SELLING TO THE GRID.

**W**e take the supply of electricity for granted, but without it we could not live in the modern world for long. Chilled food would rot; security systems would fail; crime rates would soar; businesses would collapse. Yet, our energy supplies are more precarious than we think. Over the past decade there have been 50 major power outages across 26 countries.

The outages have serious human and financial costs. Power cuts in America cost between US\$25 and US\$180 billion per annum. The indirect costs, especially related insurance claims, are up to five times higher. Meanwhile, the global addiction to electronic devices increases while fossil fuel supplies decline.

Hugh Byrd, Professor of Architecture at the UK's Lincoln University, has 30 years' experience working on international energy policy. He says the best solution to blackouts and energy shortages is for businesses to generate their own electricity. Forward-thinking businesses gain energy security and a potential income when excess generation is sold back to the grid.

But the corporate world has been slow to wake up to the dangers. "One striking case was in Auckland, when all the offices in the central business district were shut down for five weeks due to a blackout. That should have been a lesson of the dangers, but more recent blackouts have shown that little has been learned," said Byrd.

It cost Auckland a fortune to put things right. The city spent NZD\$120 million (US\$93 million) to restore the power supply, NZD\$110 million (US\$85 million) to protect the new cables, and a further NZD\$70 million (US\$54 million) on compensation claims. Byrd describes this and other scenarios in his compelling book *Energy and the City: The Technology and Sociology of Power (Failure)*.

#### The spread of global blackouts and their impacts

He gives examples of severe blackouts all over the world. For example, in South Africa, in January 2008, a blackout shut the three largest gold mines and two biggest platinum mines with international consequences. Within minutes, the global commodities price rose by 5%. Blackouts were so frequent in Kenya in 2010 that Nairobi's restaurants planned menus of cold food in the event of an emergency.

In the same year, the Chinese authorities imposed electricity rationing to meet efficiency targets in Hebei Province. On occasions, the consequences have been tragic. In Pakistan, load-shedding during a heat wave resulted in 12 hours a day without electricity for a period of weeks. Hundreds of people died of food poisoning from eating rotten food out of their powerless freezers.

"Investment in energy saving has been slow in the corporate world because it is a

low cost compared with labour," said Byrd. "But the cost of not having energy can be catastrophic. There are opportunities to both increase energy security and reduce carbon emissions."

Byrd says more sustainable businesses will reduce dependency on centralized energy supplies and lower prices. "The oligopolies of the power industry need to be challenged and that can only be done by competition," he said. "If corporates generate power it helps to overcome the other technological problems that will grow in years to come, including power supply espionage and increased demand due to electric vehicles and air-conditioning."

#### Electricity v fuel

In 2008, the world's population was 6.7 billion. This is predicted to rise to 8.5 billion by 2035. In the same period, demand for electricity will grow by 80% requiring an additional 5,900 gigawatts. Greenpeace are demanding a European supergrid that relies heavily on renewable sources. It estimates a cost of €209 billion per annum until 2050. The future may not come cheap.

Byrd's study quotes David Crane, the CEO of NRG Energy, on the issues: "It is not for lack of effort or money, but rather because the American power industry deploys technology designed in the 1800s to manage a system of wires and wooden poles that is ill-suited to the weather challenges of the 21st century." Byrd says these types of archaic practices cannot continue. Corporates need to take a long, hard look at their energy policies and consider what is good for the planet. It could well turn out to be good for business, too.

The Dodd-Frank Act was supposed to stave off another financial crisis by introducing a raft of regulations. But the lobbying of the Big Six banks has ensured that the most important measures, including limiting the size of banks, have been left out. David W. Smith reports

REFORMING  
WALL STREET  
WHAT DODD-FRANK FAILED TO FIX



## 6 Solutions

## SALT'S SIX STEPS TO PREVENTING ANOTHER CRASH

**1** Increase core capital ratios to at least 6% of risk-weighted assets, reducing the current precarious levels of low-cost leveraging.

**2** Eradicate the much-criticized performance-related bonus structure which has rapidly escalated in recent decades, creating new millionaires on an annualized basis with many bonuses exceeding 100% of salary. These rewards encourage personal greed which motivates unnecessary risk taking. They are unethical and contradictory to the steadfast behaviour of the institutions' founding fathers who engendered trust through their example of prudence, stability and discretion in their business strategy.

**3** Consider moving towards a uniform reward system based upon a maximum allowable employee bonus pool of, say, 25% of corporate profits earned each year after tax, with personal limits on distribution of this pool restricted to a maximum of 50% of an individual's gross annual salary. Of course, many banks will attempt to circumvent any restrictions by invoking salary augmentation processes for high-performing employees, but at least this process would reduce risk and prove more acceptable to shareholders, potential stakeholders, client bases and the general public.

**4** Banking regulators must now move towards stricter, hands-on supervision for all banks. None should be regarded as too-big-to-fail. Since 2009, banks around the world have racked up a cumulative total of £1.90 billion (US\$295 billion) in fines and settlement fees, with a further £1.46 billion (US\$227 billion) set aside to pay for additional fines. These fines for misconduct, mis-selling and misdemeanours should be deducted in full from the allowable employee profit-sharing pot prior to allocation and distribution of annual bonuses. Arguably, provisions set aside for poor quality credit with a high risk of default should also be deductible.

**5** For any trading year in which corporate losses are experienced, no profit-sharing pool should be allocated for employees on the basis that all employees share collective responsibility for their bank's trading results in good times and bad.

**6** Shareholders are the true owners of the banks and employees should be encouraged to invest in the long-term performance of their banking employers. Short-termism in holding these shares for fast capital appreciation should be discouraged as this creates a destabilizing effect. It could be reasoned that only 20% of an employee's annual bonus should be allowed in cash, with five-year lock-ins invoked for shareholdings purchased with the remaining 80%. This would also enable the claw-back of bonuses, where these are proven to be ill-earned with the benefit of hindsight as is frequently the case.



LEFT: CHRIS DODD AND BARNEY FRANK  
BELOW: IMF CHIEF CHRISTINE LAGARDE.

The Dodd-Frank Act of 2012 is an impressive-looking tome. It weighs in at 2,000 pages and that is not even counting the hundreds of pages in supplementary documents interpreting the opaque legal jargon. Then there are all the amendments to the Act. The new Volcker Rule, which tries to restrict speculative investments, adds another 1,000 pages to the pile.

The density of the regulations can give the impression that the Obama administration has clamped down strongly on banking power. But this is false, or at least an over-simplification. The rules and interpretations were written with the "kindly" assistance of lobbyist lawyers from the Big Six banks. Independent economists were not invited to the debate. The banks made some concessions, although they concealed them in a mountain of obfuscation. Most importantly, they did not agree to be shrunk to a safer size and remain too-big-to-fail.

Simon Johnson is one of America's leading experts on banking reform, but Congress failed to invite the British-born former chief economist of the IMF to help formulate the regulations. It is likely that the uncomfortable truths told about the US Government and bankers in Johnson's book *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown* made him unwelcome at the seat of power.

In short, the bankers wanted to protect a system that has allowed them to grow fat from critical scrutiny. "The essence of the business model is that the bankers have the Government behind them. This is not a left-wing perspective. It is shared by right-wing economists like the University of Chicago's Eugene Fama and left-wing economists like Joseph Stiglitz," said Johnson. "Both camps agree that what we are looking at is not a market but a subsidy scheme. The intellectual right and left get it, but not the political right or left."

Johnson says the US banks "regulatory capture" of US Government policy has been largely untouched by the crisis. "The biggest banks were put back on their feet with no strings attached in 2008 by President Obama. The 13 bankers were called into the

White House in March 2009 and saved, including their jobs, pensions and boards of directors. Everything about how they saw the world was intact," he said.

### Lobbying power

Having restored the banks' power, Obama then promised financial reform. "But once they were back on their feet, with the bonus structure and all the rest of it intact, they could plough their money into lobbying to prevent reforms," said Johnson.

The absurdity of the situation prompted Treasury Deputy Secretary Neal Wolin to deliver an angry speech to the US Chamber of Commerce in 2010. Wolin accused the Chamber's lobbyists of holding back reform by spending US\$1.4 a day funding four lobbyists per member of congress. "Wolin told the Chamber it had to stop, but why would they? They like the system the way it is," said Johnson. "It lets them take on risk, and let's them cash out when the times are good."

The irony of the Dodd-Frank reforms is that their byzantine complexity conceals their limitations. Having preached the need to be free of regulatory constraints in the run up to the 2008 crisis, the banks conceded the need for more regulations. But they have influenced the wording every step of the way.

Bob Ivry, author of *The Seven Sins of Wall Street: Big Banks, Their Washington Lackeys, And The Next Financial Crisis*, is disillusioned with the scope of Dodd-Frank. He says the same Big Six banks at the core of the crisis are bigger and badder than ever. "Dodd-Frank has changed little.

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If the Big Six could hop on a bubble tomorrow they would. What the Government created with the bailouts we live with today, which is moral hazard – the belief that if I make money it's mine but if I lose it it's yours," he said.

A major problem with Dodd-Frank, Ivry said, was its over-reliance on regulators to police the banking sector. "Regulators stink at their jobs. Although they're hard-working and earnest, there aren't enough of them and they aren't well-paid considering how much they have to do. The fact is their track record is lousy and any reform that relies on them to pinpoint problems before they happen is doomed to fail," he said.

### Cap the size of banks

Ivry believes the single most effective measure would be to cap the size of the banks. "Too-big-to-fail banks are anti-competitive and antidemocratic. If you make a rule that the biggest financial institutions have to be restricted to US\$500 billion in assets, then if they got into trouble, the taxpayer would be off the hook. The shareholders would suffer, the creditors would suffer, the customers and employees might suffer, but not the taxpayer."

A capping solution would work well because of its simplicity. "You could allow them to do anything they liked within the law and it wouldn't be necessary to layer on regulations. If they screwed up, they would be hurt and not the rest of us. It would be the best way to prevent dangerous risk-taking by the big banks because they would have to suffer the consequences," Ivry said.

The capture of the American political establishment by the Big Six US banks involved the gradual removal of regulatory restrictions. What Johnson refers to as the "weakening of the levees" began in the 1970s, picked up pace in the 1980s during Ronald Regan's presidency and really took off in the 1990s. In 1993, Wall Street gained even greater influence over the Democrats' economic policy when Robert Rubin became President Clinton's Treasury Secretary after spending 26 formative years with Goldman Sachs.



"The Government was won over during this period by the ideology of finance," said Johnson. "It's true that there was a revolving door between the Government and Wall Street, but the real ability of the banks to get what they wanted was all about ideology. They convinced themselves, and many others in politics and academia, that finance was good, that unregulated finance was better, but completely unfettered, large financial institutions were best. They created a set of financial firms that cannot be allowed to fail."

The biggest bank not to be bailed out following the 2008 crash was CIT Group, which had more than US\$60 billion in finance and leasing assets. It was not enough to qualify for federal aid, whereas Goldman Sachs' US\$1.1 trillion accounts and Citigroup's US\$2.2 trillion in assets placed them in the too-big-to-fail bracket.

The ongoing guarantee of Government support gives the Big Six banks an unfair competitive advantage. According to a recent International Monetary Fund (IMF) report, security against failure provides a guarantee to creditors which lowers funding costs by about 100 basis points, or one percentage point. The IMF says these implicit subsidies are worth up to US\$70 billion per year for the US banks, and as much as US\$300 billion for eurozone banks.

#### Resisting reform

The IMF chief Christine Lagarde told an audience in London recently that banks were still resisting reform and focused on excessive risk-taking to secure their bonuses. "The behaviour of the financial sector has not changed fundamentally in a number of dimensions since the crisis. The industry still prizes short-term profit over long-term prudence, today's bonus over tomorrow's relationship."

She added: "The bad news is that progress is too slow, and the finish line is still too far off. Some of this arises from the sheer complexity of the task at hand. Yet, we must acknowledge that it also stems from fierce industry pushback, and from the fatigue that is bound to set in at this point in a long race."

Simon Johnson agrees that much more needs to be done. "There's been progress with Dodd-Frank, but it's not been fully implemented yet and there's still a lot of fighting about very important details. The game is still on and it's not even half-time," he said.

Johnson says that if the reforms were to stop now, there is a danger the next crisis could be even bigger. One of the greatest flaws of the system is that there is no cross-border resolution mechanism in place to wind down banks. Although Dodd-Frank

mandates the creation of a resolution authority, it would not be able to control inherently global US banks.

"That's a big loophole as four of the six largest US banks are inherently global – JP Morgan Chase, Morgan Stanley, Citigroup and Goldman Sachs. We would need a cross-border resolution authority and prior agreement between all governments involved over who gets assets in the event of failure. Without it, you cannot have the orderly liquidation of a bank like JP Morgan Chase," he said.

Just as important would be insisting on more equity in the financial system, he says, so that banks are not running highly leveraged operations. More equity gives them far more loss absorption capacity. Before the crisis, the Big Six banks had about 2% equity and 98% debt on the liability side of the balance sheet, meaning they were leveraged 50:1.

The new regulations have improved the situation slightly. The Volcker Rule places some limitations on risk-taking and the recently adopted Basel III framework has raised equity requirements. But Johnson says the measures do not go far enough. Right now, the big banks have on average 3% equity and 97% debt and the latest leverage rules will improve this to 5% equity and 95% debt for the largest eight banks by 2018. Whilst a ratio of 20:1 is a great improvement, Johnson a higher ratio is needed to ensure financial stability.

Johnson agrees with Bob Ivry that a major weakness of the Dodd-Frank act was not restricting the size of banks. The Brown-Kaufmann amendment to Dodd-Frank would have capped them, but it was voted down by 61 votes to 33 in the Senate in 2010. Johnson said there was no necessity for big banks. The US achieved prosperity without such gargantuan financial institutions. "My concern is that next time we could have an even worse crisis. If we have the same incentives towards massive risk-taking, the banks could scale up. This is what they are paid to do," he said.

[ DODD-FRANK HAS CHANGED LITTLE. IF THE BIG SIX COULD HOP ON A BUBBLE TOMORROW THEY WOULD. WHAT THE GOVERNMENT CREATED WITH THE BAILOUTS WE LIVE WITH TODAY, WHICH IS MORAL HAZARD – THE BELIEF THAT IF I MAKE MONEY IT'S MINE BUT IF I LOSE IT IT'S YOURS ]

[ Bob Ivry ]

## THE SWEDISH BANK THAT IS NOT ALL

# MONEY MONEY MONEY

SWEDISH BANK HANDELSBANKEN DOES THINGS DIFFERENTLY. THERE ARE NO BONUSES AND DECISIONS ARE TAKEN AT THE 800 LOCAL BRANCHES IN 24 COUNTRIES. YET, HANDELSBANKEN HAS HAD AVERAGE ANNUAL GROWTH IN EQUITY OF 15% AND BLOOMBERG RATES IT THE STRONGEST BANK IN EUROPE. DAVID W. SMITH SPEAKS WITH UK BOSS ANDERS BOUVIN ABOUT THE SECRETS OF HANDELSBANKEN'S SUCCESS.

#### Why did you join Handelsbanken?

When I was at university in the 1980s, I wanted to be a dealer with all the screens and telephones. But I ended up choosing Handelsbanken after I'd been to a couple of interviews because it felt right. After a few years, friends from university started changing employers as they thought the grass was always greener. They used to say, "Anders you've been there for three years. What's wrong with you?" That's when I understood Handelsbanken's model fitted my values. We aim to recruit the best people at a young age and keep them until they retire. Staff turnover is low.

#### How does the model work?

The key element is our devolved structure. The bank is based on local people taking local decisions and not having head office stifle them. We just leave them to get on with it. After all, what do I know about people in York, or Huddersfield, when I'm down in London? It's better to let Chris, in York, take all the decisions. We call this the church spire principle, meaning every branch has its defined market area which should be no larger than you can see from a local church tower.

The model is humanistic. If you allow people to take responsibility and show trust in them, the vast majority respond positively and don't do silly things. Having faith in people boosts motivation and leads to better quality decisions than with a traditional command and control model, where head office takes decisions remote from the customer.

#### Can you give a practical example?

Take our branch in Huddersfield, in West Yorkshire. Since the crisis, there are fewer branches of the big banks and a customer would never get to meet a decision-maker. Everything is centralized elsewhere. At Handelsbanken's branch in Huddersfield, Tony and his team are all local people embedded in the community. Potential customers meet local decision-makers and once they become a customer, the same people service them. They don't get brushed off and sent to a central phone number.

#### How did Handelsbanken develop the approach?

When Jan Wallander became CEO in 1970 he introduced the decentralized model. He replaced absolute targets with the relative goal of having a higher return on equity than the average of our competitors. We don't know if it will take 12% or 18% and we don't care. As long as we are always better than our competitors we should be successful every year. We've achieved the goal for 42 consecutive years.

#### How does the Oktogonen profit-sharing system work?

Mr Wallander said banking is a service industry and, if we achieve our goal, it's because our staff have out-performed our competitors. So they deserve a share of surplus. It was a radical suggestion as he was asking shareholders to give up some profit, but he made a convincing case that it was in the shareholders' interests. He suggested the Oktogonen scheme, which puts part of the surplus

## JAN WALLANDER: THE VISIONARY ARCHITECT OF HANDELSBANKEN

ALTHOUGH THE HISTORY OF HANDELSBANKEN GOES BACK TO THE SPRING OF 1871, ITS RADICAL MODERN STRUCTURE DATES BACK TO THE 1960S WHEN THE BANK RAN INTO A CRISIS. THE MANAGEMENT RESIGNED EN MASSE AND, IN 1970, THE BANK RECRUITED JAN WALLANDER FROM THE NORRLAND PROVINCIAL BANK SUNDSVALLSBANKEN AS THE NEW CEO. WALLANDER TURNED OUT TO BE A REVOLUTIONARY.



He introduced new ideas which Sundsvallsbanken had started to practice, but he took them further than his old bank. The first thing he did was extensively decentralize Handelsbanken. In the early 1970s, the branch offices were divided into eight regional banks, each consisting of about 70 offices. The new

regional banks had their own boards and many important duties were devolved from head office.

But that was just the start of Wallander's vision. He considered budgets an unnecessary evil and replaced them with a new financial reporting and management system based on the actual profit outcome. Wallander's Handelsbanken focused on profitability rather than volumes. The goal was, and still is to this day, to have "a return on equity that exceeds the average for the other listed banks".

From having lower profitability than its competitors in the late 1960s, Handelsbanken managed to achieve the same level of profitability as the other banks in 1971. Since 1972, Handelsbanken has met Wallander's goal of being more profitable than the average for other listed banks.

A condition for achieving better profitability is that Handelsbanken employees outperform their peers. Consequently, the management thought it reasonable that they should share in profits. In February 1973, the board decided to allocate SEK 10 million to a profit-sharing foundation called Oktogonen formed by Handelsbanken's trade union club. The funds were invested in Handelsbanken shares, giving the employees owner representation on the board. Since the managed funds are not paid out directly, but at the time of retirement, Oktogonen became an informed, long-term, major owner – something lacking in many companies. A large part of the funds were invested in Handelsbanken shares. Since 1998, Oktogonen has owned around 10% of the voting rights in Handelsbanken.

into a pot to be shared equally between all staff in absolute terms. Then it goes into a staff-owned foundation and the money is invested predominantly in Handelsbanken shares. No one can access the money before they turn 60. Oktogonen has around 10% of the shares.

Oktogonen is an important part of the management model. In every Handelsbanken branch you always hear conversations about 'our way' and Oktogonen. It's the glue that sticks everything together.

### No one at Handelsbanken gets a bonus, including the CEO. Why is this?

If you buy into the Handelsbanken model, you buy into bonuses not being part of the remuneration. You get a competitive salary. Most staff join us from short-term, targeted bonus cultures with head offices telling them what to do. They have been chasing silly targets that didn't add value for customers. But it's not an issue once they grasp what Handelsbanken is about.

Short-term goals can be dangerous. We saw in the financial crisis a dangerous cocktail of mixing long-term risks with short-term personal incentives. We take a long-term view in everything with Handelsbanken, whereas other banks have weekly, or even daily, targets.

### What are the economic benefits of the Handelsbanken model?

Our model is counter-cyclical. What happens at the tail-end of a boom, such as in 2005 and 2006, is branch managers are more likely to say 'no' because they know their local community and have a strong feeling for when things are getting too leveraged and crazy. Because other banks are more skewed by volume targets and incentives they continue to say 'yes' and fuel the economy when you want to cool it down.

The opposite happens when the economy dips. Due to the fact that many of the bad decisions are taken at the tail-end of the boom, many banks run into problems when the curb dips and all their

energy becomes internal as they deal with problems instead of supporting customers. At Handelsbanken, we gain market share at these times, which helps to revive the economy when it needs it.

### Could the model appeal to other banks?

It would be easier for smaller banks to emulate, but they'd have to think about it a lot. It's one thing wanting to revamp a model and quite another being able to do it. First of all, you'd need to get rid of four, or five, layers of middle-management that don't add value to customers, and put your best people in local branches. You can't decentralize to people who don't know the nuts and bolts of banking.

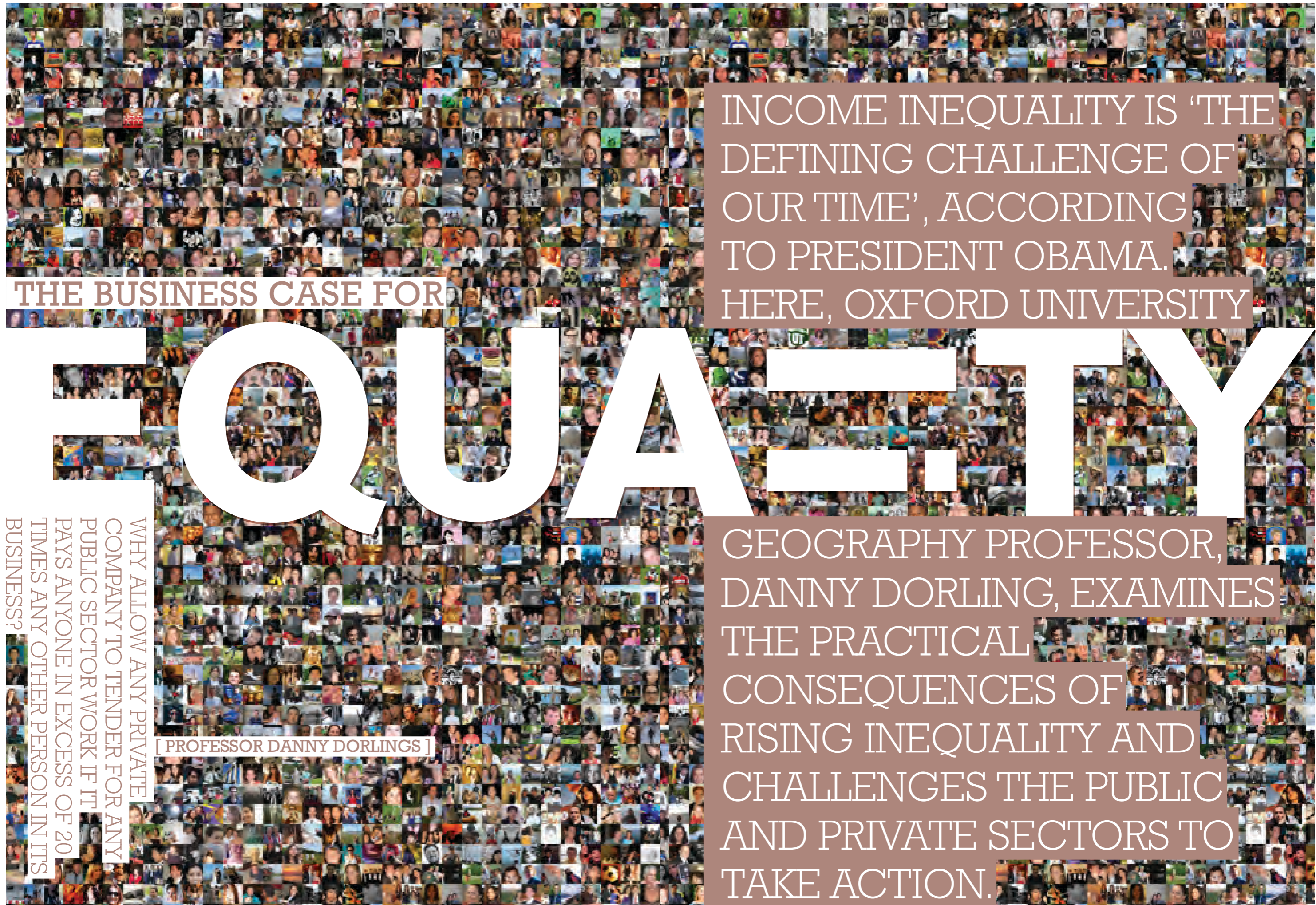


ANDERS BAUVIN



POTENTIAL CUSTOMERS MEET LOCAL DECISION MAKERS AND ONCE THEY BECOME A CUSTOMER, THE SAME PEOPLE SERVICE THEM. THEY DON'T GET BRUSHED OFF AND SENT TO A CENTRAL PHONE NUMBER.

[Anders Bouvin]



THE BUSINESS CASE FOR

INCOME INEQUALITY IS 'THE DEFINING CHALLENGE OF OUR TIME', ACCORDING TO PRESIDENT OBAMA. HERE, OXFORD UNIVERSITY

# EQUALITY

WHY ALLOW ANY PRIVATE COMPANY TO TENDER FOR ANY PUBLIC SECTOR WORK IF IT PAYS ANYONE IN EXCESS OF 20 TIMES ANY OTHER PERSON IN ITS BUSINESS?

[ PROFESSOR DANNY DORLINGS ]

GEOGRAPHY PROFESSOR, DANNY DORLING, EXAMINES THE PRACTICAL CONSEQUENCES OF RISING INEQUALITY AND CHALLENGES THE PUBLIC AND PRIVATE SECTORS TO TAKE ACTION.

As the gap between the richest and poorest in Britain widens to new extremes, almost every other little gap between us is being pulled apart. No matter where you are along the income spectrum, among your small group of friends and associates a few are moving away from you.

Most workers are conscious of where they stand. Even way up the income scale, you might be on the bank board, but if you are the director responsible for procurement, rather than finance, foremost in your mind is the finance director's pay. Below you, salaries are barely rising with inflation. Further down they have been frozen. You feel simultaneously cheated by the winners above you and fearful of joining the losers below.

No matter how well you do, you are climbing a ladder where the rungs above are widening faster than those below. Down below, the situation looks worse than a couple of years ago. Above you people complain about receiving no pay rises, and though their mortgage payments are less, above them their bosses are getting paid more.

We are given many scapegoats that are easier to understand than a society being stretched out on the rack of inequality: 'globalization', 'greedy bankers', 'all those foreigners', 'the feckless and lazy'. And we are now more likely to blame others. As Alison Park said in a British Social Attitudes Survey: "If you look back at the previous recession, you find that people became more sympathetic... that hasn't happened this time."

**'Victorian' pay gap**

We all need to pay more attention to the numbers. The High Pay Commission says if trends continue by 2030 the best-off 0.1% will earn 140 times the average income. The last time this happened Queen Victoria was on the throne. To get to where the High Pay commission said we are heading, one in a thousand people must receive an annual pay increase of over £100,000 each year – for 20 years. That is the course on which the UK is set. From today until 2030, the richest 0.1% will be paid £11 more than the hour before.

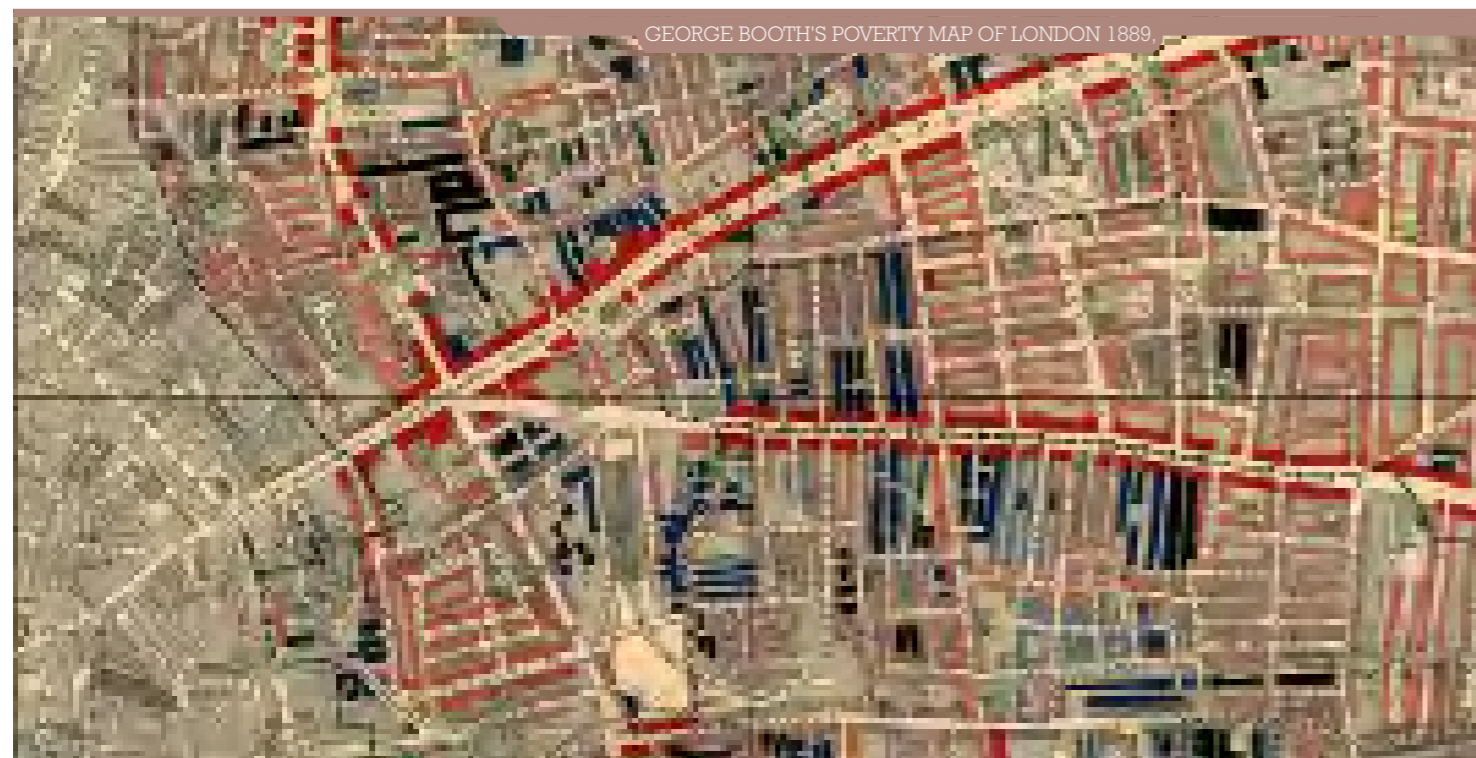
Inequalities have been rising for some time. Just before he became Deputy Prime Minister, Nick Clegg lamented that between 1997 and 2008 the best-off fifth were receiving 7.2 times the incomes of the poorest fifth by the time Tony Blair left office as opposed to 6.9 times when he became Prime Minister. But most people within the best-off fifth do not feel much better-off.

If you work full-time and earn around £14 an hour you just qualify to be in the best-off fifth. You are in the middle of that group if your pay is close to £21 an hour. That translates to a salary of just over £40,000. Nine out of ten people earn less than £40k a year. But if the people above you get average pay rises of £5,000 a year, your £40,000 income feels paltry. Compared to the top 1%, the remaining nine-tenths of the top 10% are also being

squeezed. So, maybe the 99% are beginning to all be in it together.

Those in the UK with an income just below the top 1% - who mostly live in the South East - lose out in competitions to buy homes and pay school fees. For them too, those above have financially been moving away farther and faster.

IT IS POSSIBLE FOR PUBLIC BODIES TO INSERT A CLAUSE IN THEIR CONTRACT THAT SAYS THEY WILL NOT EMPLOY PRIVATE CONTRACTORS WHO DO NOT PAY THE LIVING WAGE.



**Chavs and toffs**

I am not suggesting we pity the rich. But I'm saying that redistribution would be good for everyone. As inequalities grow, the top 'toffs' become even more distant from the rest, and at the bottom more children are labelled 'chavs'.

The only countries with comparable statistics where the richest 1% earn more than in Britain are Argentina, Singapore, South Africa and the US. In Finland, France, Japan, New Zealand, Norway and Spain the richest 1% earn only nine times average earnings, or less, – in Switzerland 7.8 times; in Sweden 6.7 times and in the Netherlands 5.4 times. The Swiss have bankers, the Swedes industrialists, and the Dutch host multinational companies. They just don't tolerate such excess.

The Sunday Times had recorded the best-off individuals in Britain taking an initial hit from the 2008 crash, but then recorded their wealth rising by 30% in a year. The 1,000 richest people in Britain saw their average personal wealth grow from £336 million each in 2010 to £369 million by 2011, to £414 million by 2012. By 2013, it was £450 million each on average. This is unsustainable, grossly unfair, and damaging to a society facing austerity.

**Public and private solutions**

Almost all methods used in other countries to reduce inequality would work here. It is possible to make it anathema to pay anyone in a public body more than 20 times anyone else. Why not cut funding from public bodies which insist on excessive pay at the top?

It is also possible for public bodies to insert a clause that says they will not employ private contractors who do not pay the living wage - Boris Johnston manages it in London. It is also possible to insert value-for-taxpayers-money clauses which bar the wasting of public funds on contracting private firms who pay excess top salaries.

If we want the inequality rack to stop stretching, the rungs at the bottom need to rise. George Bush proved it is possible to increase benefits during a recession, just before leaving office in 2008. It is also possible to introduce a small basic income for all such as exists in Sarah Palin's Alaska.

Pay restraint at the top saves more money than any programme of government cuts to public sector jobs. Pay and benefit increases at the bottom are the most efficient means of increasing consumer demand. It was redistribution of wealth which changed this country from thirties misery to swinging sixties. Do the same again and by the time my children are my age Britain will be at the European average for income inequality, rather than the most unequal of large European countries. What kind of a twisted view of social justice and human nature would you need to oppose a little more social justice and a little less economic extremism?

GLOBAL GENDER GAP PERSISTS IN JOBS AND POLITICS

WOMEN HAVE ALMOST CLOSED THE HEALTH AND EDUCATION GAPS, BUT ACCESS TO WELL-PAID JOBS AND POLITICAL POWER ARE PROVING MORE ELUSIVE IN MOST NATIONS.

The World Economic Forum predicts that women will achieve gender parity 80 years from now in 2095 if the current trend of slow improvement continues. The problem is not so much health and education, where women have largely closed the gap. Despite achieving near parity in education, however, women are struggling to access well-paid jobs and political power. This is an issue even in some of the wealthiest nations, although there are also beacons of hope, especially in Scandinavia and some African nations.

According to the Global Gender Gap Report 2014, the health care divide has narrowed to just 96% and the educational gender gap is just 94% on average for 142 countries surveyed. But for economic participation, the gap is still 60% worldwide. It has barely improved from the 56% level when the Forum started measuring it in 2006. The gap for political empowerment is even worse, standing at just 21%.

The Nordic nations offer a path to follow for the whole world. They occupy the first five positions - Iceland comes top, followed by Finland, Norway, Sweden and Denmark. Meanwhile, the US climbed three places to 20 in 2014, after narrowing its wage gap and increasing the number of women in parliament. Among the BRICS, the highest-placed nation was South Africa in 18th.

In Europe, France made the biggest improvements, moving from 45th to 16th largely due to an increase in political representation. France now has 49% women ministers, one of the highest ratios in the world. Meanwhile, the UK went in the opposite direction, falling eight places to 26th. It has around 25% female ministers.

The Philippines is Asia and Pacific's most equal country, followed by New Zealand (13th) and Australia (24th). But only one other nation, Mongolia (42), places in the top 50. Japan is a notoriously male-dominated culture and placed 104th. China fell 18 places to 87th, largely due to its low sex ratio at birth, and India slumped to 114th, making it the lowest-ranked BRICS nation. It is one of the few countries where female labour force participation is shrinking.

The Middle Eastern countries scored poorly. The region is home to the most male-dominated country, Yemen, which, at 142nd, finished last since 2006. Kuwait, at 113th, was the highest-placed in the Middle East just ahead of the UAE in 115th.

Sub-Saharan Africa, meanwhile, is performing far better than the Middle East. It has three countries in the world's top 20. The highest placed, Rwanda, scored highly in economic and political participation and was the highest-ranked developing country in the index. Next was Burundi, in 17th, followed by South Africa. Nigeria, the region's largest economy, fell 12 places to 118th.

**GORDON SHARPE**  
THE FINANCIAL FUTURIST



# GDP v GPI:

*Why GPI is a superior measure of economic growth?*

THE CONCEPT OF GPI (GENUINE PROGRESS INDICATOR) IS CATCHING ON FAST BECAUSE IT OFFERS A MORE OBJECTIVE MEASURE OF ECONOMIC PERFORMANCE THAN GDP, SAYS GORDON SHARPE, ECONOMICS LECTURER AND FORMER BANKER.

Despite its limitations, Gross Domestic Product (GDP) is still the principal guide to national economic performance. It measures how the four main domestic factors of production - land, human resources, capital and entrepreneurship - combine to produce both national income and growth. GDP statistics trigger important government decisions on fiscal and monetary strategy. The IMF, OECD and World Bank all use GDP statistics to compare the performance of different economies and the EU uses GDP to set its budgets.

But the GDP method is far from perfect. Measuring the relative international performance of national economies using quantitative methods says nothing of disparities across income earners. Nor does it include voluntary work production. There are also wide divergences across nations in the number of citizens in abject poverty, or earning inordinately high incomes. Without qualitative measures, we cannot draw conclusions about a nation's growth in relation to the wellbeing of its citizens.

**The emergence of Genuine Progress Indicator (GPI)**

Since the turn of the century, a new measure - GPI - has emerged. It includes the fullest possible qualitative study of the wellbeing of citizens in its assessment of economic strength. GPI is GDP plus extra measurements on a range of welfare statistics. For example, it considers the impact of natural disasters, pollution and deterioration in ozone. GPI calculates the value of voluntary work as though

THE PROPONENTS OF GPI BELIEVE THAT IT IS DEVELOPING INTO A DIVERSE, ADAPTABLE, LOCALIZED AND RESILIENT MEASURE OF THE NEW 'SUSTAINABLE ECONOMY'

**Gordon Sharpe**

volunteers are paid in full. It increases when citizens enjoy more leisure as value is attached to play. Proponents say it is a diverse, adaptable, localized and resilient measure of the new 'sustainable economy'.

GPI's usage is fast-increasing in the US, where Vermont, Minnesota, Ohio and Utah have used it for years. In Maryland, the GPI developers have identified 26 contributory elements to real prosperity for their index of sustainable welfare (ISEW), including urban sprawl; traffic congestion; rate of conversion of greenfield sites; crime rates; health issues. According to GPI, economic growth has not improved the welfare of US citizens in the past 30 years.

**Growing popularity**

GPI concepts have since been taken up by Australia, Canada, Chile and Japan, whilst in Europe, Austria, France, Italy, Holland, Scotland and Finland are also early adopters. GPI is in its infancy and in time could take account public provision of education, physical health facilities, transport and housing.

This is a good time for Global CEOs to have a strong influence on the factors they would like to see incorporated within GPI measures. There is more and more pressure to make ethical choices for investments. GPI measures provide a direct measure which makes governments accountable for their own business environments.

The usage of GPI will increase exponentially. There is pressure to harvest more energy from renewables, to increase energy efficiency and to eliminate vast income inequalities. The global poverty line - often referred to as 'the dollar-a-day line' - will receive a lot of attention. New targets will be devised by early adopters of GPI indicators, and non-user nations will be forced to follow suit. The most lucrative investors must make discerning, ethical choices in the best interest of their shareholders.

CHINA, FOR SOME TIME, HAS NOT HAD TO INNOVATE IN ORDER TO GROW. IT ONLY NEEDED TO REAP THE BENEFITS OF ITS DEMOGRAPHICS.

Professor Cai Fang

# IS CHINA'S GOVERNMENT PREVENTING IT BECOMING THE WORLD CENTRE OF INNOVATION

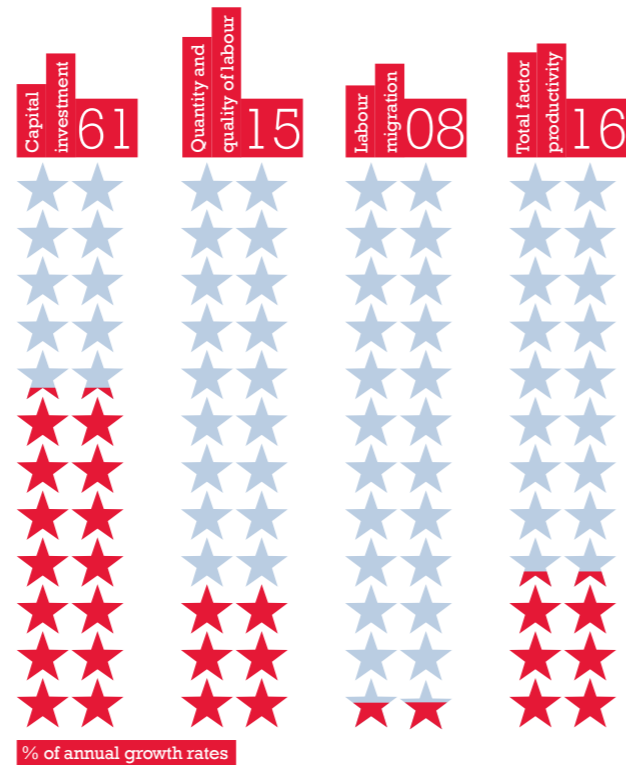
China's huge economy gives it competitive advantages, but the Government's role in supporting innovation can have a suffocating effect. **Professor Cai Fang**, Director of the Institute of Population Studies at the Chinese Academy of Social Sciences, sets out his vision for how China can become the world leader in innovation.



by borrowing technologies from more advanced counterparts. Innovation, in fact, has played a relatively small role in driving China's economic growth. The country's 'backwardness' in some ways gave it a competitive advantage, although this only works until a country exhausts traditional sources of growth.

**Economic slowdown**

China, for some time, has not had to innovate in order to grow. It simply reaped the benefits of its demographics. Having a rising proportion of the population of working age has guaranteed a sufficient supply of labour and boosted returns. Thanks to unique demographics, China has achieved a high growth rate without a significant contribution from innovation in the past 35 years. But this demographic dividend is disappearing. There has been a decline in the number of people aged between 15 and 59 since 2011 and in 2012, Chinese economic growth began slowing down. Some growth theorists say such a slowdown is inevitable once all the low-hanging fruit has been picked. Whilst that is true, China's lack of innovation is an even greater factor. So, an important question arises at this point: Is China ready to become the world centre of innovation?



Due to its enormous size, China is expected to become the world centre of innovation, just as it has become the world centre of manufacturing. But there are factors holding it back, chiefly a lack of innovation. To achieve its potential, China urgently needs to make the transition from an inputs-driven growth mode to an innovation-driven growth mode.

China's growth has been spectacular, but this does not necessarily translate into being a technology leader. During its period of reform, China witnessed miraculous annual growth rates of 9.8% between 1978 and 2012. But not much of it was down to technological advances. It was mainly a result of the inputs of physical capital and the expanding labour force. My research indicates that most of the growth – around 61% - was down to capital investment. A further 15% was down to the quantity and quality of labour and 8% came from labour migration from agricultural to non-agricultural sectors. Only 16% of growth was down to so-called "total factor productivity", which refers mainly to technological progress and innovation.

A growth centre does not necessarily have to be a centre of innovation. Less developed countries can achieve fast growth

The most significant fact about innovation in China is the central role played by the Government in supporting scientific research and development. The Government certainly has money to spend. In 2010, China replaced Japan as the world's second largest economy and in 2012, China spent 1029.8 billion yuan – or US\$165.1 billion on R&D, around 1.98% of GDP. Even more impressive is the growth rate of R&D expenditure, which increased by 123% from 2008 to 2012, faster than any other country.

All the R&D has produced a rapid expansion in innovation. The Government's close involvement encourages effective team-based work in scientific research and technological development. In 2012, the Chinese Government spent 21.6% of its total R&D expenditure on supporting research programmes. China leads the world in the number of scientific papers, as well as the total number of patented applications. In addition, China's large GDP of 51.9 trillion yuan provides a vast market that enables innovative applications to be profitable. The value of the technology market at current prices increased from 155 billion yuan in 2005 to 644 billion yuan in 2012, which is an annual growth rate of 22.5%.

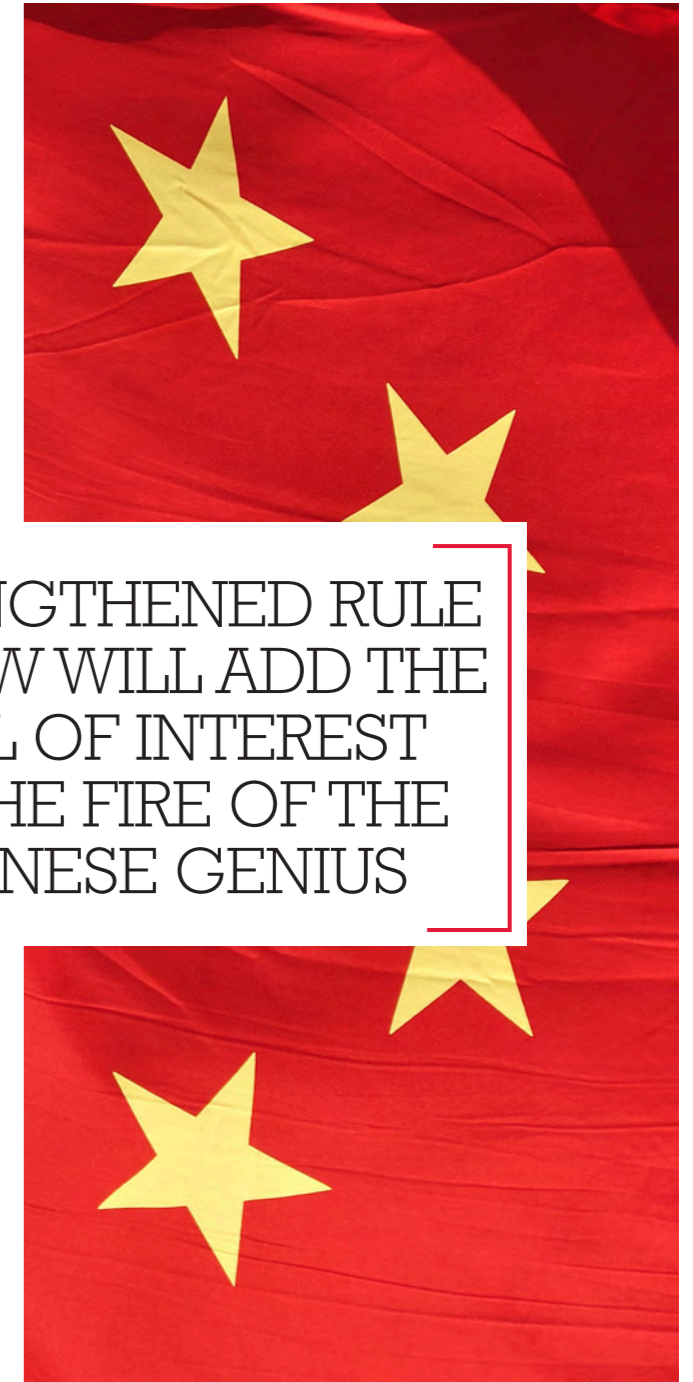
The technology market can only enlarge as China drives out labour-intensive manufacturing. As a result, the "flying geese" effect will see manufacturing shift from coastal to inland areas. Meanwhile, the so-called "leading dragon" effect will see China's investment in other developing countries, such as those in Africa, making the home technology market even bigger.

**Quantity not quality**

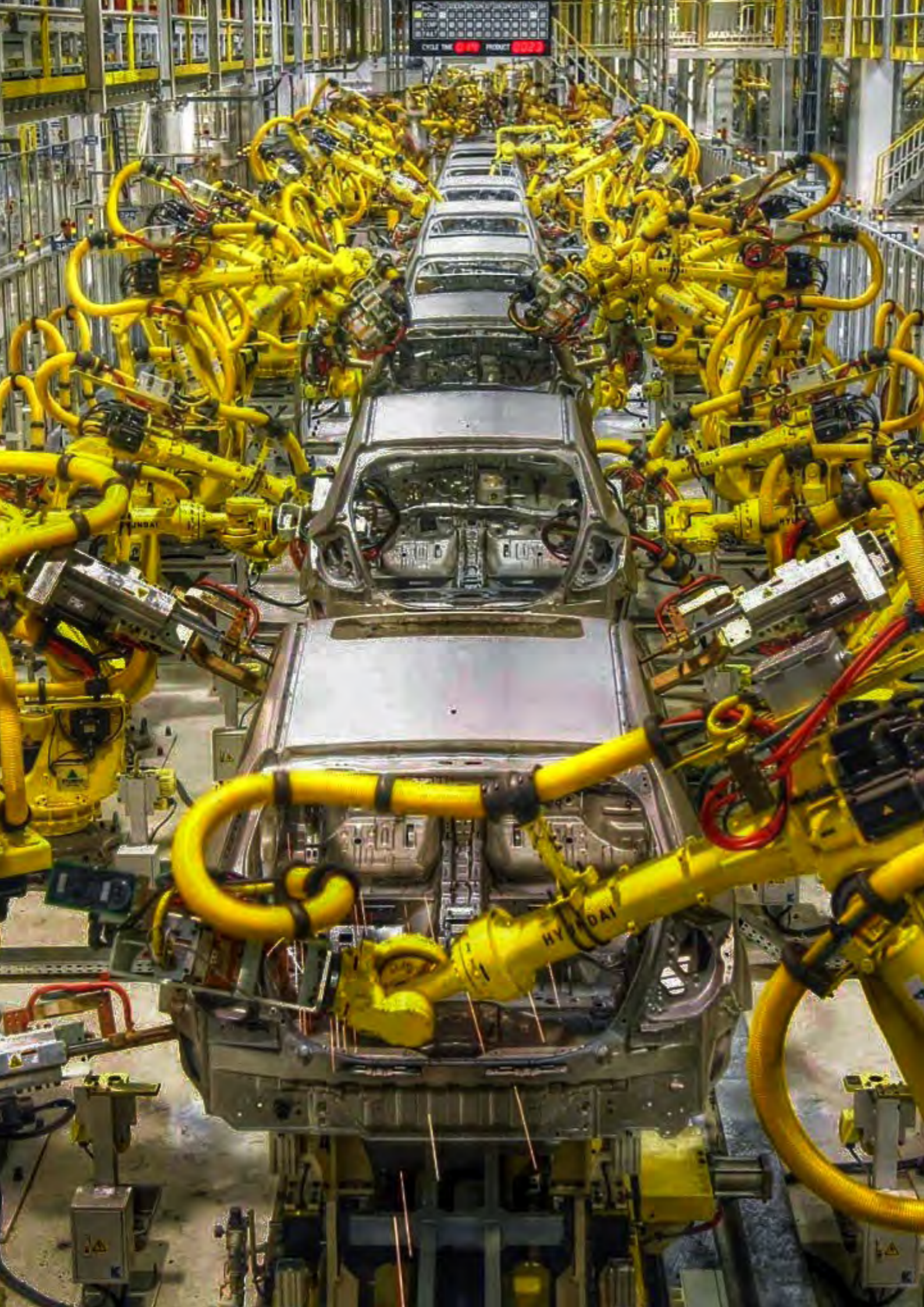
But despite all China's competitive advantages, there are factors restricting innovation. As the ancient Chinese saying goes, "misfortune is the next-door neighbour of luck". The reliance on government-dominated investment in R&D has produced a rapid growth in quantity without equally impressive progress in quality. One measure of quality is to look at the ratio of published scientific papers which are cited. China's papers are cited only 25% as often as those of the frontrunner – Switzerland.

One problem with big firms snapping up all the state funding for R&D is the absence of financial allocations to small and medium enterprises (SMEs). SMEs account for over 98% of the total number of Chinese businesses, contribute 70% of technological innovation and 65% of invention patents. The dominance of large-sized firms reduces China's capacity for innovation. Yet another problem is that the human capital in China is scarcely ready to innovate.

**STRENGTHENED RULE OF LAW WILL ADD THE FUEL OF INTEREST TO THE FIRE OF THE CHINESE GENIUS**



7000BC	1600BC	500BC	500BC	400BC	100BC	206BC-23AD	659AD	868AD	875AD	619-907AD	850AD	1100AD	1600AD	
<p><b>THE CHINESE CAN LAY CLAIM TO BEING THE WORLD'S GREATEST INVENTORS. THEY CREATED THE SO-CALLED 'GREAT FOUR' INVENTIONS, THE MAGNETIC COMPASS, GUNPOWDER, PAPER AND PRINTING. BUT THERE WERE MANY OTHER EXTRAORDINARY CHINESE BREAKTHROUGHS. HERE IS A CHRONOLOGICAL LIST.</b></p>	<p><b>Alcoholic drinks</b> Around 9,000 years ago in Jiahu, a settlement in central China, early humans fermented rice, honey and fruit to create the world's first alcoholic drink.</p>	<p><b>Porcelain</b> Porcelain is used for items from toilets to crockery, and was one of the first reliable materials of its kind invented around 16th century BC during the Shang Dynasty.</p>	<p><b>Pig iron</b> During the Zhou Dynasty in the 5th century BC the Chinese discovered the process to make pig iron, the first use of the metal.</p>	<p><b>Cast iron</b> In Jiangsu, during the 5th century BC, the Chinese invented the less brittle and more useful cast iron. Cast iron eventually reaches Europe in the 1500s.</p>	<p><b>Trebuchet</b> In the 4th century BC the Mohists invented the traction trebuchet. It's smaller with a shorter range than larger siege engines. It was one of the earliest advanced weapons.</p>	<p><b>Stern mounted rudder</b> In the 1st Century BC, the Chinese made use of a stern-mounted rudder, preceding their use in Europe by 1,000 years.</p>	<p><b>Paper</b> The earliest form of paper first appeared to this by over 1,000 years. In a 659 AD Chinese medical text dental amalgam, used for fillings was discussed. The material didn't reach Europe until 1528.</p>	<p><b>Dental amalgam</b> The Chinese beat Europe to this by over 1,000 years. In a 659 AD Chinese medical text dental amalgam, used for fillings was discussed. The material didn't reach Europe until 1528.</p>	<p><b>Printing</b> The Chinese invention of woodblock printing, at some point before the first dated book in 868 AD (the Diamond Sutra), produced the world's first print culture.</p>	<p><b>Toilet paper</b> In 875 AD, the Chinese imperial family ordered 2x3 foot sheets of perfumed paper to be used as the first ever toilet roll. Toilet roll was also introduced as a hygiene product in China in 1391.</p>	<p><b>Bristled toothbrush</b> During the Tang dynasty (619-907 AD), the first bristled toothbrush was created, using hog bristle attached to bone or bamboo.</p>	<p><b>Gunpowder</b> Again during the Tang dynasty, around 850 AD, an alchemist mixed 75 parts saltpeter with 15 parts charcoal and 10 parts sulphur and lo and behold there was a flash and a bang.</p>	<p><b>Magnetic compass</b> The Chinese were using the magnetic compass around 1100 AD, western Europeans by 1187, Arabs by 1220, and Scandinavians by 1300.</p>	<p><b>Inoculation</b> Earliest records of inoculation of smallpox are from 10th century China, and the first credible reference comes from the 1600s, still 100 years before the west usage. Inoculation was vital in preventing smallpox.</p>



The overall level of human capital is still low in China. For example, only 10% of Chinese workers have a college degree, compared to 40% in the United States. In addition to the insufficient numbers of well-educated workers, the low quality of education is a problem. Although there has been a steep rise in the number of graduates from colleges – from 850,000 in 1999 to nearly 7 million in 2013 – the incompetence of many graduates is an alarming trend.

Chinese parents lack the motivation to send their children to school. This is an unfortunate downside of changes in Chinese wage structures. In 2004, the country reached its 'Lewis turning point', the moment when labour shortages combine with inflation to the wages of unskilled workers to signal the end of an era of unlimited labour supply. Nobel Laureate Arthur Lewis said the transition was a characteristic of developing countries. As a result, it becomes much easier for unskilled workers to find a job in the labour market at higher wages, which creates a disincentive to continue to study. Instead of pushing children to move on to senior high schooling and higher education, households now encourage them to enter the labour market earlier.

A further issue which urgently needs addressing is that China will have to strengthen its protection of intellectual property rights to become the world centre of innovation. This wasn't a major problem when China was catching up. The gap with developed counterparts was so large that weak protection of intellectual property rights helped China to acquire technologies at low prices. But the situation is different now. The absence of a sound system of intellectual property rights will harm the nation's own capacity for innovation.

The World Bank coined the term "middle-income trap" to indicate how the factors helping a country to escape the poverty trap might also hinder its transition to a high-income country. The principle applies as China's attempts to become a centre of innovation. Whereas China's rapid growth, volume of trade, economic size and global influence can all help it to become the world centre of innovation, there are still significant institutional barriers keeping it as a middle-income nation.

Massive investment in science and technology is not enough to make China an innovative economy. China can achieve this goal only if it makes the following significant adjustments:

#### **The way forward for China**

First, the state's near monopoly on R&D has to end. It leads to inefficiency in resource allocation and low quality outcomes. To further spur technological progress, more competition for resources has to be created by allowing the free entry of various agents, whether state or privately-owned.

Second, much stronger action has to be taken to protect the incentive to innovate. Although there are laws to protect intellectual property rights nationwide, local governments, motivated by regional protection, implement them selectively. This not only causes market segmentation, but also undermines the incentive to innovate. Building an integrated national market for innovation requires the consistent enforcement of intellectual property law across the country. Strengthened rule of law will add the fuel of interest to the fire of the Chinese genius.

Third, the Chinese Government must abolish the household registration system, which prevents 171 million rural-to-urban migrant workers from having equal access to public services in urban areas. Because they are not allowed to dwell in cities permanently, migrant workers have to make as much money as they can during a smaller proportion of their working lives. The pressure to earn money quickly de-motivates them from continuing their studies.

Furthermore, as a result of unequal access to compulsory education, migrants' children are either being left behind at their grandparents' rural homes, or brought along with their parents as migrant children. Both situations deprive them of compulsory education, let alone higher education. But as the working-age population has shrunk since 2010, labour supply in China increasingly depends on rural migrants. The poor education of the next generation of the Chinese workforce will jeopardize the sustainability of growth which depends on well-educated and innovative workers. □

CHINA, FOR SOME TIME, HAS NOT HAD TO INNOVATE IN ORDER TO GROW. IT ONLY NEEDED TO REAP THE BENEFITS OF ITS DEMOGRAPHIC

[ PROFESSOR CAI FANG ]



# THE EARTH NEEDED A GOOD LAWYER

BARRISTER POLLY HIGGINS WAS LOOKING OUT OF THE WINDOW AT LONDON'S COURT OF APPEAL ONE DAY AND THOUGHT 'WHAT AM I DOING HERE WHEN THERE IS SO MUCH ENVIRONMENTAL DESTRUCTION IN THE WORLD?' SHE DECIDED TO BECOME AN ENVIRONMENTAL LAWYER. SHE TELLS DAVID W. SMITH ABOUT HER CAMPAIGN TO PERSUADE GLOBAL LEADERS TO MAKE ECOCIDE THE FIFTH CRIME AGAINST PEACE.

## Why do we need a law of ecocide?

We know from reports by the UN and the International Environment Agency that continuing with business as usual is not an option. We are on a trajectory. The Carbon Majors Report last year concluded that nearly two thirds of carbon dioxide emitted since the 1750s can be traced to the 90 largest fossil fuel and cement producers, most of which still operate. There's a plethora of expertise showing species extinction is escalating off the chart and we're having unnatural climate events globally, including in Britain.

## Will the law help to prevent climate change?

As a lawyer, I am not dealing with the here and now. A law of ecocide is not dependent on whether you are a climate change believer, or denier. The law of ecocide requires only evidence of 'significant harm'. It goes to the source of the problem and says that if we cause mass damage and destruction that has an adverse impact on the planet we need to be held to account.

Look at the 'dirty oil' on the Alberta Tar Sands in Canada, or the razing of the Amazon rainforest; you can see clear evidence of mass damage and destruction.

## How close is the law to being enacted?

This law could be fully operational within five years. It's a matter of political will and keeping the ball rolling. All that is being sought is an amendment to the Rome Statute. To do that takes one Head of State



POLLY HIGGINS

who is a signatory to call for it to be tabled for signatories - then it becomes a numbers game. Once there is a two thirds majority among the 122 signatories, it becomes international law.

## How would it work in practice?

The 122 signatories have to put in place an Ecocide Act, or equivalent legislation, in their country and it becomes incumbent on them to take prosecutions. The International Criminal Court (ICC) will step in as a 'Court of Last Resort' if a country doesn't take action. One proposal is that the ICC makes a preliminary ruling on whether an ecocide is or has occurred in a member state. Rather than conduct the trial in the

Hague, the ICC can order a neutral country, such as Switzerland, to open up one of its courts to hold an ad hoc tribunal to hear the case. We already have precedent for this approach.

## What will be the effect on countries not signed up to the Rome Statute?

It will vastly curtail their activities. For instance, the US is not a signatory so it would only be allowed to continue with dangerous or hazardous activities on its own land. Elsewhere, it would become a marginal player, damaging its economy. What's hopeful is that big transnational corporations, extractive companies and energy companies will

## DEFINITION OF ECOCIDE:

“The extensive damage to, destruction of or loss of ecosystem(s) of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been or will be severely diminished.”

want to come on board to retain their market advantage. Once we have an international law of ecocide suddenly there are enormous consequences to investing in a company that is continuing with ecocide globally even if it's lawful in its own country. The money markets will dry up fast.

## Who will get prosecuted ?

International crime has the Principle of Superior Responsibility. It was put in place during the Nuremberg War Tribunals. It recognizes the necessity to prosecute those in the command and control role first as they make decisions with adverse

consequences for hundreds of thousands at the bottom end. This could mean ministers of state, CEOs, directors, but also finance directors and heads of banks who are investing in ecocidal projects.

A big problem with the existing litigation is that when you take action against a company, you can't pierce 'the corporate veil'. There's no point in putting a piece of paper - that's all a company is - in a criminal dock. All you can do is fine a company and they usually have a reserve pot of money, so the decision-makers get away with it.

But international criminal law is different. It attaches itself to human beings so it's not

a defence to argue in criminal law that he or she did it for profit, or that it creates jobs. It's important that key decision-makers are accountable. If you are going to take on the responsibility of heading up a company you have to make sure your employees and sub-contractors are not causing significant harm.

## How will companies feel about the law?

Companies work well within a duty of care. They have a natural desire to thrive and given a clear legislative framework they will say 'okay, now we are going in this direction instead'. The majority of companies want a legislative framework. Those who object are the ones who want to get away with causing significant harm and, in truth, most people don't want to cause harm. Most say 'how amazing that it's not a crime to cause mass damage and destruction in the first place'.

We've tried policies involving offsets and companies volunteering to behave better and it hasn't worked. We are in a worse position now, so what is required is to take the next step and make it illegal. At the moment, were BP to go beyond petroleum, their bottom line would suffer as there is no legal requirement in place that creates a level playing field.



AS A LAWYER, I AM NOT DEALING WITH THE HERE AND NOW. A LAW OF ECOCIDE IS NOT DEPENDENT ON WHETHER YOU ARE A CLIMATE CHANGE BELIEVER, OR DENIER.

[ Polly Higgins ]

#### What are the potential economic benefits?

The legal requirement to be constructive will drive enormous innovation. Research centres and universities should be tasked by governments to find new solutions to x, y and z. Most companies are stuck in the ecocidal way of being. And current laws do not help. Most companies are just tweaking at the edges to keep on going, rather than ensuring their businesses no longer cause ecocide. Once a law of ecocide is in place the overriding legal duty of care will be to ensure no significant harm occurs. That is the quantum leap forward that is now required.

#### Can we justify the law on economic grounds?

No, the issue of liability is not a question of economics in criminal law. The law arises from an understanding that if we continue with what we are doing we are causing such significant harm that we are putting humanity at risk. William Wilberforce never argued for the abolition of slavery on the grounds that it would be good economically. He deliberately left that to one side and made the moral argument that wrong must stop. A new criminal law arises when we take a moral wrong and make it a legal wrong. That doesn't mean it's stopped entirely, but we have the tools to deal with it and far less happens. A 'do no harm principle' becomes our overriding starting point. Then the money will flow. □



LEFT: POLLY HIGGINS TED TALKS TALLINN  
FROM THE TOP: SYNCRUDE UPGRADER PLANT NORTH OF FORT MCMURRAY. [Jiri Rezac/Greenpeace].  
AURORA TAR SANDS MINE IN THE BOREAL FOREST. [Jiri Rezac/Greenpeace].  
DEFORESTATION AROUND SINOP AND THE PARQUE DAS CASTANHEIRAS. [©Daniel Beltra/Greenpeace].

**CHRIS NICHOLS**  
THE BOARDROOM ALCHEMIST



## Memo to CEO "Get lost"

ONE OF THE GREATEST GIFTS A CEO CAN GIVE IS THE PERMISSION TO EXPLORE AND GET A BIT LOST ALONG THE WAY. THIS GIFT HAS NEVER BEEN STRATEGICALLY MORE IMPORTANT, WRITES CHRIS NICHOLS, AN ASHRIDGE ACCREDITED COACH AND BOARDROOM CONSULTANT.

**M**ost CEOs aspire to run a business that is sustainable and responsible. They want to helm an organization that satisfies customers and investors and, at the same time, works in the safe operating space on our finite planet. This is what resilience will look like in the coming years. But the challenges of plotting our strategic futures can't be resolved from a position of certainty. If it was that easy, everything would already have been solved.

As we face the need to build resilient organizations, the capacity for CEOs to explore uncertainty and inspire others to do the same will be crucial.

#### 1. CEOs need to know when to explore new approaches

A first step is to be rigorous about whether existing expertise can address issues. With an existing map, navigation is possible. and answers can be found. But some important strategic questions are not on a CEO's map. Without ready-made expertise, you are in the "exploration" zone.

It is an important part of leadership to identify what is unknown and set a disciplined agenda to find the innovation required. Leaders must not settle for false certainty. It's better to accept real unknowns and explore them well than to continue with the pretence of knowing

#### 2. Get comfortable with being "off the map"

There is a common fantasy that "the CEO knows", and an expectation they will provide answers. It is important for a CEO to hold a firm position here. When large groups of people are anxious about their futures, they become dependent and leaders feel the pull to intervene.

But if CEOs want to harness the collective intelligence of their teams, they need to make the invitation carefully. It is easy to be drawn into the equivalent of heroically mounting a white horse and offering a vision. Instead of heroism, it's better to go for invitation and information.

It's a good idea for CEOs to tell people what is and isn't known and set up a clear framework for exploring time, budget, responsibilities and reporting requirements. CEOs should set a purpose, but not a destination unless it's certain. Staff need to be invited to imagine how new options might work. It's not about creating a democracy. It's more about everyone unearthing the best possible ideas.

#### 3. Cultivate curiosity

Good leaders need to be role models for bringing curiosity into a company's strategic work. They should be open to all the places they might come from. The freshest perspectives don't always emerge

from the old trusted sources and strategic allies.

CEOs need to walk about and notice what is happening, and treat the inquiry processes as flexible. Workers need to feel they can talk across different parts of the strategic exploration. CEOs can also stir things up by making use of provocations and catalysts. All the insight won't necessarily come from inside the organization. Various perspectives are valuable.

#### Leading beyond knowing

Th qualities that get someone to CEO often don't sit well with taking a position of not knowing. The veneer of visionary certainty is more familiar CEO territory. Of course, it's fine to act like you're certain, as long as you really are. But in the search for strategic innovation, one of the best leader investments is encouraging the capacity to learn in others. This does not imply over-theoretical learning filled with tools and models, but a capacity to open eyes and ears, to learn beyond silos and expertise, to learn and unlearn as you go.

My hunch is that in the coming years the best CEOs will be the ones with an appetite for exploring, who cultivate the skill of inviting others to explore and learn with them.

*Chris Nichols has run creative strategy processes around the world for over 25 years. He is deeply involved in resilience and sustainability issues. He co-directs the Ashridge MSc in Sustainability and Responsibility. He is at: [chris.nichols@ashridge.org.uk](mailto:chris.nichols@ashridge.org.uk) and on Twitter @chrisnicholsT2i*

# SANERGY'S TRIPLE BOTTOM LINE: LOOS THAT SAVE

PEOPLE IN LOW INCOME COMMUNITIES IN KENYA ARE WILLING TO PAY FOR SANITATION FACILITIES, SO THAT PRESENTS A MARKET OPPORTUNITY FOR OUR NETWORK OF ENTREPRENEURS

Sanergy co-founder David Auerbach

# LET'S

FOR 28-YEAR-OLD ALEX WEKESA THE DEATH OF HIS NEIGHBOUR'S 14-MONTH-OLD SON WAS THE MOMENT HE REALIZED HE HAD TO DO SOMETHING TO PREVENT MORE CHILDREN DYING FROM A LACK OF BASIC SANITATION.

The little boy had been doing what toddlers do – crawling around in a field, picking things up. But that bare ground doubled as an open pit latrine, where locals dumped “flying toilets” – plastic bags filled with waste. To add to the dangers, the area was a gathering point for criminals dealing in drugs.

“My neighbour’s boy became very ill, very quickly,” said Wekesa, a micro-entrepreneur who lives in Mukuru, a slum of 500,000 residents near Nairobi’s industrial area. “He got diarrhoea and never recovered – and all because of a lack of good sanitation. It was a turning point for me. I decided I never wanted to see another child ill, or dying again.”

Now Wekesa is the proud owner of two of Sanergy’s Fresh Life toilets – brightly coloured concrete constructions placed in the heart of Mukuru. Each one contains soap and water to clean hands.

Wekesa charges four Kenyan shillings (0.03p, 0.05 US cents) for adults to use the facilities and two shillings (0.01p, 0.02 US cents) per child. And instead of the waste being strewn across the streets in plastic bags, it is taken away daily in sealed 30-litre cartridges to a processing site, where it is converted into organic fertilizer.

“Before people were throwing bags everywhere – it was a dangerous place for children to play,” said Wekesa. “But now the streets are so much cleaner and it’s creating jobs for people from my community.”

The toilets are made by Sanergy, a Kenyan-based social business that aims to provide sustainable and affordable sanitation in Nairobi’s urban slums. They are the brainchild of four graduates from Massachusetts Institute of Technology who wanted to find a business solution to the problem.



## IAN COX: AN AMERICAN LEADING THE AFRICAPITALIST MOVEMENT

IAN COX IS A MAN WHO HAS FOLLOWED A SOMEWHAT DIFFERENT PATH TO THAT OF MOST ENTREPRENEURS IN HIS COUNTRY OF ORIGIN. COX IS AN AMERICAN, WHO HAS CHOSEN TO OPERATE A BUSINESS IN SOUTH SUDAN, A FAR CRY FROM WALL STREET, OR INDEED ANY AMERICAN MARKETPLACE.

The firm he has founded is called Lorry Boys, and is based around the sale and transportation of vehicles suitable for the terrain in the South Sudan, which was only granted statehood in 2011. On the face of it such a new country, born from a referendum after many years of conflict between the Government and rebels, would not seem to be a sound place to start a business.

Cox, however, begs to differ. From his base in the Kenyan capital of Nairobi, he imports the vehicles and then arranges for their transport to his clients all over South Sudan. In December 2013, President Salva Kiir accused Vice-President Riek Machar of attempting a coup, leading to violence in South Sudan as supporters of each leader took to the streets fighting one another, but even this was not enough to prevent Cox remaining in the area.

Cox first moved to Africa in 1995 to do humanitarian work after he finished school, and between then and the early-2000s he was constantly travelling between the US and several states in Africa. Eventually he settled in Kenya. After working in several jobs, he decided to go it alone, and when the 2005 peace agreement was signed allowing for a referendum on South Sudan's future Cox decided South Sudan was the place he wanted to do business, initially selling satellite phones and eventually opening a shop selling electronics.

When business dried up in 2011 he closed his shop, but shortly after he was asked by a friend to help sell a Toyota Hilux to his business contacts. Having made the sale he was soon asked by a security firm for a full fleet, and he established Lorry Boys. With the rise in Africapitalism, it is predicted the future will see more and more entrepreneurs like Ian Cox, travelling from Western nations to invest in the potential of the African markets.



IAN COX

### Risk of rape

Some 2.5 billion people in the developing world do not have access to a hygienic toilet, resulting in the deaths of over 500,000 children each year from disease. Having to go out under the cover of darkness also puts women at risk of rape and assault. According to a report by Amnesty International, the shortage of toilets and places to wash in the slums heightens the risk of gender-based violence. In May this year, two teenage girls were gang-raped and killed in India after they went outdoors to the toilet.

In the Nairobi slum of Mathare, a mother-of-two contracted HIV after she was attacked en route to a field latrine. "We're hearing that people feel much safer because the Fresh Life toilets are much closer to the community," said Sanergy co-founder David Auerbach. "And research suggests that having access to a clean toilet reduces the incidence of diarrhoea by 40%."

The toilets are sold to entrepreneurial locals for US\$600, which includes business advice, marketing assistance and supplies such as a mop, bucket and solar lantern. While the outlay is high, for a community whose average earnings are around US\$10 (£6) a month, many are using Sanergy partners Kiva, a non-profit group that facilitates micro-lending, to help operators invest in Fresh Life.

"People in low income communities in Kenya are willing to pay for sanitation facilities, so that presents a market opportunity for our network of entrepreneurs," said Auerbach. "The facilities are owned and operated by people from the community so they're investing their own money into them and that's a very different approach to a company coming in, fitting the toilets and expecting the community to change."

"Instead they are champions for what we're doing and are reaping the benefits too because they are keeping all the revenue from charging people to use the toilet, so they're incentivised to ensure they're providing clean toilets, good opening hours in convenient locations and a service the customer wants."

Sanergy employs 220 Fresh Life entrepreneurs, who in turn have hired 80 attendants to clean and run their business. The 170-strong Sanergy team, who construct the toilets, sell them, work in marketing, communications and government relations are 93% Kenyan.

Alex Wekesa's business is going so well he employs a sole mother to keep his toilets clean, to record payments and to attract new customers, leaving him enough savings to stock his boutique with second hand clothes. Other Fresh Life owners set up small kiosks next to their toilets to sell nappies, toilet paper, toothbrushes, toothpaste, washing powder, soap and petroleum jelly to make extra cash.

From 50 customers a day when he opened his first toilet in July, 2012 – just two months' after his neighbour's death – Wekesa, who holds a certificate in analytical chemistry from Eldoret Polytechnic, now has 150 customers on weekdays and up to 180 on weekends.

And if people cannot pay now, Wekesa allows them to settle up later. "The best thing about informal settlements is people can always earn money doing casual jobs like washing clothes, selling soap and flour, which means they can pay Alex weekly or even monthly, according to how they get the money," said Sanergy communications officer Esther Njeri.

### Fertilizer drives revenue

But for Sanergy, it is the waste-to-fertilizer side of the business that is the "real driver of revenue". "While farmers are very keen on organic fertilizer, none is produced domestically in Kenya



- instead it is imported," said David Auerbach. "We're working with a variety of farms, from wheat to vegetables, tea and coffee, and all our trials are showing increased crop yields and much healthier soil – the farmers have been really enthusiastic about what they have seen. So to be able to provide a nutrient rich, pathogen-free fertilizer as a compliment to the imported, synthetic variety is a great opportunity for us."

And Sanergy is now exploring further uses for the material. "At a pilot level we're experimenting with extracting gas from the waste which naturally produces methane. Kenya has regular power shortages so there's a case for independent producers selling electricity to the grid."

So far Sanergy has 425 facilities in the network around Mukuru, serving 18,000 users a day - but Auerbach admits Sanergy needs to collect the waste from 1,000 outlets, serving 50,000 people, to break even, which he expects it will do by 2016.

The company's annual budget of US\$1.5m (£876,000) is propped up by a mix of capital support, private investment and grants from foundations and governments. Auerbach says it is Sanergy's entire sanitation value chain - which encompasses toilets, waste collection and reuse - that is a particularly attractive model to potential funders. "People are very interested in the business approach to solving a social challenge," he said.

Sanergy is now working in partnership with

ABOVE: ALLEYWAYS OF MUKURU  
BELOW: ALEX WEKESA WITH TOILET

Oxfam to introduce Fresh Life toilets to 15 schools in the Mukuru area. The move has already increased attendance and enrolment rates by 20%, especially among girls. "Parents are choosing these schools because of the facilities that are on offer," said Auerbach.

But while there is always pressure to expand and broaden its offering to other countries and disaster zones, Auerbach says there is sufficient need for adequate sanitation in Kenya to keep Sanergy going for some time. After all, the project has already succeeded in reaping some unexpected rewards for the locals who run and use the facilities in Mukuru. Agnes Kwamboka used to earn her living making and selling an illicit brew – but spending more money paying bribes to police than she ever took home. "My

We're hearing that people feel much safer because the Fresh Life toilets are much closer to the community



children had to steal for the family to get by," she said.

But since opening her business in February 2012, she has not only been able to provide for her family, she is using the profits to learn to read and write so she is able to keep her own records. "Since I started running a Fresh Life toilet, my life has changed. I'm paying off my debts - I have inner peace - I am not constantly worrying that the police are coming to search my house," she said. "While having hygienic sanitation is very important on its own, hearing the amazing stories that have come out of this makes me very happy."



BELOW: DAVID AUBACH  
BOTTOM: FRESH LIFE FERTILISER.



## AFRICAPITALISM: THE PATH TO PROSPERITY

ONE OF AFRICA'S MOST SUCCESSFUL FINANCIAL ENTREPRENEURS, NIGERIAN BUSINESSMAN TONY ELUMELU, COINED THE TERM **AFRICAPITALISM** TO DESCRIBE THE REGENERATION OF THE AFRICAN ECONOMY THROUGH PRIVATE SECTOR INITIATIVES. ELUMELU HAS ARGUED THAT THE AFRICAN PRIVATE SECTOR WILL THRIVE IF IT IS GIVEN THE RIGHT KIND OF INVESTMENT AND INFRASTRUCTURE.

Elumelu, the chairman of both Heirs Holdings and the Tony Elumelu Foundation, has backed the Africapitalist movement with his own money. He recently committed US\$100 million to funding start-ups through his Tony Elumelu Entrepreneurship Programme (TEEP). The TEEP, which was launched in December, 2014, will help 10,000 new businesses from across Africa over the next 10 years, aiming to create 1,000,000 new jobs and US\$10 billion in annual revenues.

Elumelu says African capitalists will not thrive if they continue to rely on government backing, which in turn is reliant on aid inflows from former colonialist powers. The dependency on aid, he argues, is counterproductive to business interests. Whilst offering with one hand, the former colonial powers take with the other. Many African economies have been geared to produce for the colonialists and the goods end up being sold back as finished products at premium prices.

The success of the Africapitalist movement, Elumelu argues, has to be based on the resourcefulness of a generation of private sector entrepreneurs. Elumelu points out that the typical Western idea of Africa is of squalor, disease and aid dependency, but this image belies the continent's great economic potential if it fully exploits its enormous natural resources and human capital.

Infrastructure development is a crucial element in the picture. Elumelu's investment company, Heirs Holding, has backed US President Barack Obama's "power to Africa" initiative, announced in Summer 2013, with US\$2.5 billion of investment. The initiative aims to increase the number of Africans with access to electricity. Currently, only 20% of the continent's population benefit from reliable power sources. Africapitalists argue that an increase in that number will unlock huge economic potential.



TONY ELUMELU

DIMITRIOS TSIVRIKOS  
THE ARTIVIST



## The transformative Power of the arts

THE PRESENCE OF **ART IN OFFICES** HAS BEEN SHOWN TO IMPROVE THE MINDSET OF EMPLOYEES, MAKE LEADERS MORE CREATIVE AND EVEN ENHANCE PRODUCTIVITY, SAYS DIMITRIOS TSIVRIKOS, FROM UNIVERSITY COLLEGE LONDON AND THE P.A.R.T. ART AND BRANDING CONSULTANCY.

In recent years, creativity has become a serious business for many brands. One only need look at the "video games and on-site haircuts" ethos of Facebook and Google to see how the creative culture is being embraced.

The Noogle propeller hats are at best an excruciating example of forced fun and at worst a creepy glimpse into the Orwellian Google-owned dystopia that awaits us. But the success of these hoodie-heavy companies raises an important question – is there a place for art in proper business?

The research on the subject says there is not. Studies suggest that both art and nature can play a passive role in influencing employee behaviour. Some of the most significant psychological studies involved the exposure to nature, which was found to have significant psychological benefits. In one study a natural window view reduced tension greatly in an office environment. The presence of indoor plants had a similarly beneficial influence. Offices with no windows at all, or with no plants, produced the highest stress levels.

Art is just as powerful as nature in influencing an employee's mindset. In one classic psychological experiment, office workers had to carry out four irritating

tasks. Their stress and anger levels were far lower in offices decorated with art posters. The aesthetic stimuli improve performance on frustrating tasks by reducing negative moods.

Art and nature provide a distraction from demanding tasks and allow the conscious mind time to recuperate. Art also reduces stress and negative emotions, whilst inducing positive emotions that enhance performance.

### Financially valuable

Incorporating pleasing aesthetics in an office space often proves financially valuable. In one study, a collection agency moved to a new office, which was much more colourfully painted. In the two months following the move, compared to the two months before, the average amount collected per staff member increased by 16%. In fact, colours alone have been found to have significant psychological effects. In particular, brief exposure to the colour green enhances creative performance.

So far we've discussed the way in which the presence of art and nature makes employees feel better. But it's possible to take it much further. There is a trend for businesses to use artistic processes

to solutions to workplace issues. Some companies have introduced an artist in residence to lead the process, whilst others have encouraged employees to participate in arts training, such as sculpture or theatre.

Furthermore, exposure to the arts at work can improve soft skills. The use of art results in such positive emotions that workers are more likely to see things from a colleague's perspective. The creative nature of art encourages thinking outside the box. It results in better communication with co-workers.

Finally, the arts also have a role in leadership. A number of business and consumer psychologists argue that creativity is important for generating new ideas. So-called 'aesthetic' leaders are better able to deploy a range of intellectual and emotional abilities, and these can complement the more rational decision-making styles which tend to dominate management.

Art and aesthetics have incredible value in business, despite being largely abstract and unquantifiable. Art in the workplace can help employees to be less stressed and more effective. Meanwhile, art-based interventions enhance both hard and soft skills and encourage new ways of solving problems.

# GREEN COMEDIAN JEFF WOZER TRIES TO UNDERSTAND BIOFUELS, BUT JUST ENDS UP GETTING MORE CONFUSED.

I'M TO SCIENCE AS NORTH KOREA IS TO TOURISM. I APPRECIATE IT, I'M IN AWE OF IT, BUT I LACK THE BRAIN CAPACITY TO UNDERSTAND IT.

# THINKING BIOFUEL THOUGHTS

Besides my top New Year's resolution to make more fun of Gwyneth Paltrow, I also vowed to better understand biofuels. Not out of want but out of obligation after a friend slapped a "Think Biofuels" bumper sticker on my non-biofuel car.

As a person of green-leaning sensibilities I needed to either walk-the talk, as it were, or if asked about the bumper sticker, shrug it off as being ironic. I chose the former.

It was a daunting decision, for any word that begins with "bio" – bioastronautics, biochemistry, biography on Justin Bieber – generally gets prejudged as beyond my comprehension. I'm to science as North Korea is to tourism. I appreciate it. I'm in awe of it. But I lack the brain capacity to understand it. While scientists are landing stuff on meteors 310 million miles away, I'm still trying to understand how spiders can climb walls and ceilings but can't escape bathtubs.

And adding to my confusion is the all-inclusive nature of biofuels. Unlike fossil fuels, which are limited to oil, natural gas, and coal, biofuels seemingly encompass every animate and inanimate object in the world. There's a glibness about it. Every day a new source is added to the biofuel list. One day it's corn. The next day it's liposuction fat. The next it's algae. Each one is more brain-buckling than the next, bordering on hocus pocus science, making it difficult for the public to embrace biofuels as a credible alternative.

Out of all the biofuels, corn-based ethanol has established itself as the planet's most legitimate alternative energy source. Many worldwide gas stations offer E10 blends (gasoline with 10% ethanol). The United States, in 2014 alone, produced 13 billion gallons of it. To some, this is no surprise. Car manufacturing founder Henry Ford championed ethanol back in 1908 as the "fuel of the future".

Yet the idea of corn someday overtaking oil as the world's chief energy source staggers all logic. We're talking food here. How can deliciousness be converted into car fuel? Life as we know it would forever change.

CNN and the BBC would cover horrible stories of tanker ships running aground and fouling our oceans with cream of corn spills, turning pristine shorelines into the world's largest side dishes.

The post-apocalyptic Mad Max movie franchise would feature Mel Gibson trying to escape a roving band of crazed gang members while driving a truck full of corn niblets.

Consumers across the planet would pressure their respective governments to mandate laws requiring filling stations to label their pumps if the ethanol being dispensed is made with genetically modified corn.

Geopolitical oil interests would wane in favor of geopolitical corn interests. Argentina, the world's 3rd largest corn producer, second only to the United States

and China, would replace the Middle East as the planet's new tug-of-war hotspot. Inevitable military conflicts would erupt, prompting anti-war protestors to march on Washington D.C. waving angry signs that read "No Blood for Corn on the Cob!"

Along this same thought, inevitable droughts would cause corn-production concerns in Washington. Under pressure to keep America independent of foreign corn, the White House would propose opening parts of Yellowstone National Park to farming, igniting the wrath of environmental groups. With tensions high, the National Guard would be called in to prevent Greenpeace members from chaining themselves to John Deere farm tractors.

Candy corn packaging would require the disclaimer "Not intended for car fuel."

And parents would admonish finicky children at the dinner table to finish the corn on their plates using the logic, "There are cars in Africa with empty gas tanks."

Wow. After thinking about biofuels Gwyneth Paltrow doesn't seem so weird. I may now have to consciously refrain from making fun of her conscious uncoupling.



JEFF WOZER

[[ JEFF'S HUMOR ARTICLES HAVE APPEARED IN MORE THAN 35 PUBLICATIONS, INCLUDING THE EXPLORERS JOURNAL, CABIN LIFE MAGAZINE, AND ESPN'S ACTIVE.COM. WHEN NOT WRITING, HE SPENDS HIS TIME SITTING ON HIS CABIN DECK DRESSED IN TATTERED SHORTS AND A THICK PATAGONIA FLEECE JACKET BROODING ABOUT NOTHING IN PARTICULAR. (WWW.JEFFWOZER.COM) ]]

## [ COMPASSIONATE BUSINESS THINKING ]

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