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The Odgers Berndtson Global Magazine_ Issue 03 2015

SPECIAL ISSUE

THE AGE OF DISRUPTION

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At Odgers Berndtson, we help organisations recruit the best people for their most important jobs. In an increasingly connected and complex world, and in a time of widespread economic uncertainty, we believe our services are more critical than ever.

The ability to identify, develop and motivate ambitious and talented individuals and teams remains a vital point of competitive advantage for companies and other organisations, regardless of their size, sector or objectives.

Most importantly, this principle applies on a global basis. With a network of 52 offices in 27 countries worldwide, we know that effective leadership is a vital quality regardless of national borders.

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WHY I TOOK THE JOB

MARKETING

An exclusive interview with Nokia's Risto Siilasmaa

EDUCATION

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Disruption is everywhere and in every aspect of our lives. In whichever part of the world you live the radical changes affecting social, political, technological, digital or corporate life are profound in the extreme.

For some disruption is a force for good, for others an expression of radical change, with all of the dangers that it brings. Whichever stance you take, disruption is here to stay.

In this special issue of *Observe* we range across some of the many ways in which disruption is manifesting itself. In talent selection, education, life science, technology, crowdfunding, streaming, marketing, economics and more. We have garnered opinion and comment from business leaders around the world – their responses are diverse and in some cases surprising.

We also provide our own take on what disruption means in the world of human capital. Finding the right leaders capable of functioning effectively in a disruptive world will be a challenge for us all. Odgers Berndtson intends to stay at the heart of this process.

Finally, we are delighted to have secured an exclusive interview with Nokia boss Risto Siilasmaa as he continues to reinvent the company and steer it through disruptive waters.

We don't profess to have all of the answers. No one can do that. Instead we hope to cast some light on those areas that we believe will be most relevant to senior executives in boardrooms across the globe.

Do please tell us what you think by using the social media channels listed here.

Michael Mellink,
Managing Partner, Odgers Berndtson Netherlands

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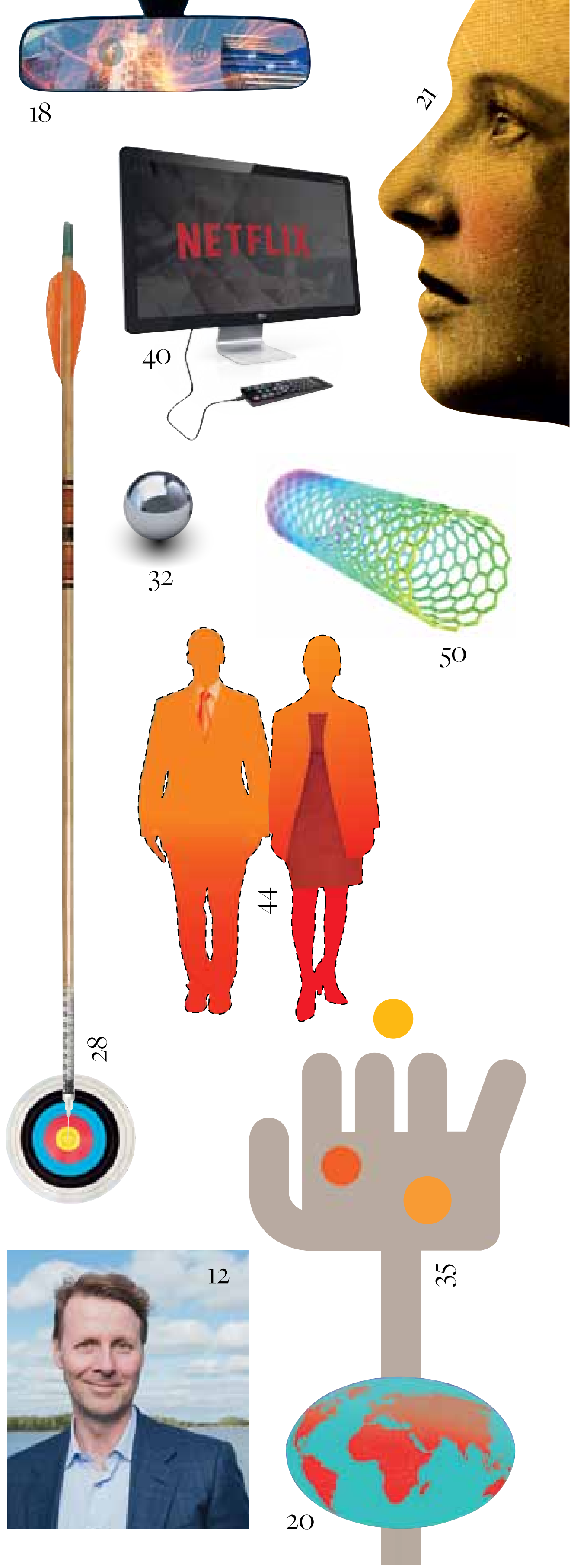

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THE AGE OF DISRUPTION touches every aspect of life, industry, business and society. Here are just some examples of the extraordinary thinking going on around the world, plus some books to read (if you have the time), apps to download and facts to digest

INTERNET EVERYWHERE

GOOGLE'S PROJECT LOON

Google has launched Project Loon that aims to bring balloon powered Internet to everyone, anywhere in any situation. Two-thirds of the world's population does not yet have Internet access. Project Loon is a network of balloons travelling on the edge of space, designed to connect people in rural and remote areas, help fill coverage gaps, and bring people back online after disasters.

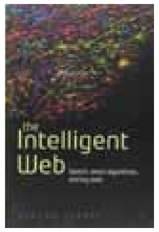
google.com/loon

BEYOND HAWKING

INTEL ASSISTIVE CONTEXT-AWARE TOOLKIT

The speech technology system used by Professor Stephen Hawking has now become available as a download – free of charge. Intel has allowed full use of its Context-Aware Toolkit to give those with a similar disease an opportunity to better communicate and improve their quality of life.

01.org/acat



SMARTER THAN YOU THINK

The Intelligent Web. Search, Smart Algorithms and Big Data by Gautam Shroff published by Oxford University Press

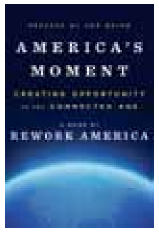
Now available in paperback, Shroff's excellent study takes us on a journey through the computer science of search, natural language, text mining, machine learning, swarm computing, and semantic reasoning, from Watson to self-driving cars. This machine intelligence may even mimic at a basic level what happens in the brain. Eye-opening stuff.

A SUITABLE CASE

TRUNKSTER

More than just a suitcase, the Trunkster is a USB charging, zipperless-entry product that has been designed to make travelling as simple and stress-free as possible. Built-in scales help keep the contents within airport guidelines, and the established GPS can aid in locating your luggage.

trunkster.co



REINVENTING WORK

America's Moment. Creating Opportunity in the Connected Age by Rework America, published by W.W. Norton

American CEOs, technologists, community leaders, educators, management experts and government officials suggest an agenda for an "exciting future in this time of change". The book includes action people can take in their own community, using the reach of the Internet and data to innovate jobs and to reach new markets and using technology to match employers and workers, transitioning to a 'no-collar' working world.

A WING AND A PRAYER

BOEING'S NEW 777X

Building on the success of the 777 and 787 Dreamliner, the 777X will be the largest and most efficient twin-engine jet in the world, unmatched in every aspect of performance. The unusual, glider-like wings of the 777X take carbon composites to a new level. Longer and more efficient, these revolutionary wings will, says Boeing, change how we fly.

boeing.com

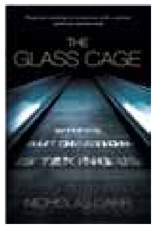
FASTER THAN A SPEEDING BULLET

HYPERLOOP TRANSPORTATION TECHNOLOGIES

Hyperloop, a conceptual high-speed transportation system put forward by entrepreneur Elon Musk, incorporates reduced-pressure tubes in which pressurised capsules ride on an air cushion driven by linear induction motors and air compressors. If it ever comes to fruition it will become the world's fastest train, travelling close to 700mph.

hyperlooptech.com

UNDER OBSERVATION



MAN V MACHINE

The Glass Cage. Where Automation is Taking Us by Nicholas Carr, published by Bodley Head

Carr, author of the ground-breaking book *The Shallows. What the Internet is Doing to Our Brains*, turns his attention to the world of automation in a panoramic exposé of the decision-making software running our lives and how it is changing us all. Rather than rejecting technology, Carr argues we must urgently rethink its role in our lives, using it to enhance rather than diminish the extraordinary abilities that make us human. →

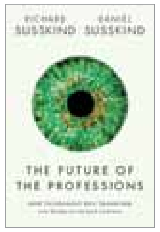
NO INTERRUPTIONS

LIGHT PHONE

This credit-card sized device that works with your existing phone, is a rather clever piece of technology that enables call forwarding without the distractions, removing the obnoxious rings, pings and other sounds that may disrupt you while you are working or in a meeting. The battery lasts up to 20 days, with speed dial and other features available.

thelightphone.com

UNDER OBSERVATION



DON'T CALL MY LAWYER

The Future of the Professions: How Technology Will Transform the Work of Human Experts by Richard Susskind and Daniel Susskind published by Oxford University Press

Doctors, lawyers, teachers, accountants, tax advisers, journalists, the clergy – until recently, argue the Susskinds, the position of individuals in these professions was almost unassailable. But in today's Internet-enhanced world all that is changing. Patients can use online systems to monitor their own illnesses. Online lectures are replacing conventional classroom teaching. Critically, the book challenges the so-called 'grand bargain' – the arrangement that grants various monopolies to today's professionals. The Susskinds claim that our current professions are antiquated, opaque and no longer affordable, enjoyed only by a few. In their place will be new models for producing and distributing expertise in society.

INTO THE FUTURE

LEXUS SLIDE HOVERBOARD

Car manufacturer Lexus has turned science-fiction into fact and created SLIDE, a fully-functioning hoverboard, which brings to life the board first seen in the classic 1985 film, *Back to the Future*. Lexus has remained tight-lipped about SLIDE and has only released teaser videos. However, rumour has it that this dynamic new mode of transport could soon be available to the general public.

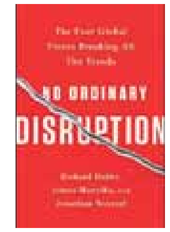
lexus-int.com

THE 3D PEN IS MIGHTIER THAN THE...

3DOODLER

3Doodler, described as the world's first 3D printing pen, allows you to draw in 3D by extruding heated plastic filament that cools almost instantly into a solid, stable structure. Perfect, apparently, for prototyping and identifying those small details which can only be verbally described by the designer.

the3doodler.com



DISRUPTION. GLOBAL STYLE

No Ordinary Disruption. The Four Global Forces Breaking All the Trends by Richard Dobbs, James Manyika and Jonathan Woetzel published by PublicAffairs

Not one but four fundamental disruptive forces are changing everything, according to the authors of this intriguing book. The four forces are: the shifting locus of economic activity to emerging markets and cities within them; the acceleration of the scope, scale and economic impact of technology, aging demographics and the looming possibility of the first-ever global population plateau and increased connectivity of the world through 'flows', with 'South-South' flows between emerging markets gaining the greatest momentum. You have been warned.

ALSO WORTH READING:

The Road to reinvention: How to Drive Disruption and Accelerate Transformation by Josh Linkner published by Jossey Bass

Big Bang Disruption: Business Survival in the Age of Constant Innovation by Larry Downes published by Portfolio Penguin

The Great Disruption: How Business is Coping With Turbulent Times by Adrian Wooldridge published by Economist Books

apps to look out for...

flint mobile a way to accept credit cards on-the-go that enables business to get paid on the spot without the need of a card reader.

Vlingo is an intelligent software assistant that uses a natural language user interface to answer questions, make recommendations, and perform actions by delegating requests to various applications.

sproutsocial is an app that brings all of your social media messages into a single, filterable stream.

expensify is an app that describes itself as "expense reports that don't suck." The app provides easy scanning of receipts and categorising of trips with a clean and intuitive UI.

Wrike is a cloud-based platform that can be used by people within virtually every business department. CEOs, managers, directors, salespeople, strategists, and marketers use Wrike to stay better connected to their co-located and distributed teams. →

DISRUPTION FACTS

- **The speed of technological adoption by 50 million users has accelerated from 38 years (radio) to nine months (Twitter)**
- **Of the US$1.8 trillion of new economic activity in 2013, US$1 trillion of it, or 60 per cent, was from China**
- **By 2025 the world's economic centre of gravity is expected to be central Asia, just north of where it was in the Year 1**
- **Between 2013 and 2025, 440 cities in developing nations will generate nearly half of global GDP growth**
- **By 2025 140 million knowledge worker jobs could be replaced by computers and 75 million jobs by robots**
- **Food prices, which fell by an average of 0.7 per cent during the 20th century, have risen by almost 120 per cent since 2000**
- **Nearly two thirds of US companies have positions for which they are unable to find qualified applicants, with the STEM [science, technology, engineering and management] fields topping the list. Only 15 per cent of US graduates major in these fields, a percentage that ranks the US behind 14 other nations and behind the global percentage**
- **China should overtake the US by 2020 on spending on consumer electronics and smartphones. In 2013 China overtook the US in retail sales with US$300 billion**

[Source: No Ordinary Disruption*, by Richard Dobbs, James Manyika and Jonathan Woetzel published by PublicAffairs]*

25 DISRUPTIVE TECHNOLOGY TRENDS 2015-2016 according to Brian Solis, digital analyst, anthropologist and futurist.

In his work at Altimeter Group, Solis studies the effects of disruptive technology on business and society. Agree or disagree with his list – and it covers a lot of ground – it makes fascinating and enlightening reading

1 Social media 1.0 is dead.
Social media becomes part of a digitally transformed ecosystem.
Real-time and content marketing becomes more sophisticated and portable Social becomes key hub for shaping customer experiences.

2 The future of search and search engineering marketing also lies outside of Google.
More than 88 per cent of consumers are influenced by other consumers' online comments. Customers are also starting searches in places such as YouTube, Pinterest and also in apps directly.

3 Messaging apps become the new social media.

4 Asia and other foreign competitors will compete to gain share and push messaging forward.

5 Notification windows introduce a thin layer for rapid engagement.
Apps such as Yo, while a novelty at first, will redefine what an app is and will be...

6 Chinese innovation is going to disrupt the US from the outside in and the inside out.

7 The Internet of Things is a hot and beautiful mess until it becomes the Internet of Everything.
By 2020, the number of devices connected to the Internet is expected to exceed 40 billion. We're just getting started.

8 Wearables will struggle to find their place in everyday life.
While cute and seemingly on the wrists, necks or fingers of all of our friends, wearables as an industry and market are incredibly immature. The Apple watch will start to create a rising tide. Most wearables are single purpose, redundant, cute or just plain useless. They need a killer app!

9 Virtual and augmented reality experiment with killer apps for consumer and vertical markets.
In 2015, Google Glass gets a *ctrl alt del*.
2015 represents the consumer introduction of Oculus Rift. Vertical industries along with gamers will drive early adoption.
Companies such as Skully are creating killer vertical applications for augmented reality.

10 Focus on the kids! Generation Z is mobile first and mobile only and they're nothing like Millennials.

11 YouTube, Vine, etc., represent a 'new' Hollywood.
YouTubers and Viners and the financial ecosystem emerging to support them are reminiscent of Hollywood in the early 1900s. More kids can name online celebrities than they can traditional movie and music stars. To capture attention, advertising and content will require an entirely new approach.

12 Cyber security becomes paramount to prevent the next #Sonygate.
Nothing creates a sense of urgency like an emergency. Sony sat on advice to upgrade security. They're hardly alone.

13 Some companies are still greedy and believe the Internet should not be open for the sake of profitability.
This will impede innovation unless we fight back.
Debate over Internet regulation positions it as either a utility or a premium service.

14 Music streaming will continue to undermine the music business and artistry. Artists will fight back.
Streaming services condition consumers to seek out their favourite music and play it for free. Sales of music continue to freefall.
Artists feel they're underpaid for stream plays.
Spotify, Pandora and the like compare payment models to radio stations.
Artists such as Taylor Swift, Garth Brooks, ACDC, et al, believe artistry is worth more than is appreciated today.
I argue that streaming services teach people to listen at will because they can, whereas radio stations encouraged consumers to buy.

15 Wall Street becomes influential again forcing brands to trump customer experience for revenue.
Stakeholders and investors find it difficult to assess the ROI of customer experiences and the impact of positive reinforcement on the bottom line. I guess you can't trade on something so fluffy. Instead, Wall Street analysts and shareholders alike accused JetBlue of being "overly brand-conscious and customer-focused." Wall Street has spoken and JetBlue CEO Dave Barger has been replaced by someone willing to embrace extra fees, narrower seats, and diminished customer experiences... unless they're willing to pay for something better.

16 Crowd capitalisation accelerates disruption... everywhere.
Everything is subject to creative destruction because ideas can now be crowdfunded. Every product. Every industry. Innovation is democratised.

17 Bitcoin and other cryptocurrencies lose value but teach us how to think differently about money.
There are 163 cryptocurrencies in circulation. Bitcoin is widely known. Though its market cap is down, The Bitcoin Stack will revive the movement.

18 Mobile payments: early today, but will soon skyrocket.
In late 2013, just 6 per cent of US adults said they had made a payment in a store by scanning or tapping their smartphone at a payment terminal. It will go up to 8 per cent this year. Apple's introduction of the Apple Pay will be the key factor that will drive this percentage up.
Mobile payments are already gaining traction. Nearly 15 per cent of Starbucks customers already pay with their phones. And, 60 per cent of consumers use their smartphones to pay because of loyalty benefits.

19 The Sharing Economy is really about renting or borrowing.
Everything will become 'on-demand' and available through mobile apps that connect idle or new supplies with new or organised demand.
New supply will stimulate new demand. Mobile platforms combined with geoloco will continue to bring everyday people and businesses together to interact with trust and efficiency serving as facilitators.

20 New enterprise drone management platforms change the game for logistics.
It's not about whether we get pizza or Amazon packages to our homes. First, drone delivery will impact B2B. Over time, the concept of a personal mailbox will be upgraded with dedicates codes that will facilitate new types of drone deliveries.

21 Cyber Warfare.
Political battles will play out in the 5th dimension.

22 Your privacy is gone: it was traded for perceived security and also better customer experiences.
Older generations think about privacy differently.
Younger generations use privacy as a currency.

23 Big data and beacons.
Connect online, in-app, and in-store experiences. Also opens the door to new forms of engagement.
Beacons provide businesses with endless opportunities to collect massive amounts of untapped data, such as the number of beacon hits and customer dwell time at a particular location within a specified time and date range, busiest hours throughout the day or week, number of people who walk by a location each day, etc. Retailers can then make improvements to products, staff allocation in various departments and services, and so on.

24 Webrooming becomes more common than showrooming (69 per cent to 46 per cent respectively), according to Harris poll.
• Millennials prefer webrooming.
• Amazon remains the number 1 destination for both showrooming and webrooming.
• Emerging connected in-store experiences link online and offline, leveraging both.

25 Mass personalisation and full funnel marketing suites reset vendor landscape and change how brands 'think' and work.

UNDER OBSERVATION

Brands and agencies start to think about 'full funnel marketing' and new 'experience cloud' suites will take shape to unite marketing, service and CRM.
New adtech companies will focus on strategy + programmatic context, content AND ads.
Optimised mobile affiliate tracking capabilities.
Publishers will offer in-house capabilities for behaviourally programmatic targeting of premium advertising.
Omni-channel finally becomes mainstream. Brands must think like their customers to create seamless omni-channel shopping experiences that keep customers engaged at all stages.

COVER STORY

NOKIA'S CALM COMMANDER

When Risto Siilasmaa took over as chairman of Nokia more than three years ago he had a huge challenge ahead of him. Here he talks exclusively to HEIDI HAMMARSTEN about his plans for reinventing the business as it faces disruptive global forces

PHOTOS BY JUHO KUVA

Risto Siilasmaa wasn't an obvious choice to take over as chairman of Nokia after Jorma Ollila finally stepped down in May 2012. Ollila acknowledged in his subsequent memoir that he had made mistakes by failing to predict changing customer needs and developing new software. Disruption in the tough environment of global mobile phone development – and an inability to keep in step – had precipitated his downfall.

So the 45-year-old Siilasmaa had much to do. He certainly had the right credentials: an entrepreneurial background from tech business, serving several years as chairman of a telecom operator, a master's degree in engineering and four years' experience serving on the Nokia board.

At the time Siilasmaa took over the helm at Nokia the health of the former Finnish handset giant was dire. During the first half of 2012, operating losses ran to €2 billion, →

COVER STORY

cash flow was strongly negative and sales were down 26 per cent.

And yet today under Siilasmaa's stewardship, Nokia is a thriving network infra-structure provider, number two in the global market. The share price has more than tripled over the past three years and its enterprise value has multiplied by more than 15 times.

A huge transformation

So what happened? Most visibly Nokia has done three bold, strategic deals: the sale of its handset business to Microsoft, the acquisition of the remaining 50 per cent share in Nokia Siemens Networks from Siemens and the acquisition of Alcatel-Lucent. And behind these deals lies a vast amount of work, including more than 100 board and board committee meetings.

"It has been a huge transformation and the board has made difficult decisions," says Siilasmaa, referring especially to the sale of Nokia's handset business, in September 2013. "But difficult decisions can be made easy when you do a load of analysis and iterative thinking. By the time the deal was signed we were certain it was the right decision."

What Siilasmaa needed to do with both Nokia and its board was to build up trust and encourage open discussion. "No news is bad news, bad news is good news, good news is no news", is his slogan for internal corporate communication.

"Everything culminates with trust," says Siilasmaa. He started his tenure as chairman by giving everybody in the board a set of five Golden Rules

PHOTO: ©ALAMY

ABOVE
HERE traffic probe data combined with sensor technology can make driving safer

LEFT
Nokia Chairman of the Board Risto Siilasmaa (left) and CEO Rajeev Suri address the media during a press conference on the Alcatel-Lucent transaction in Espoo, Finland, April 2015

to follow. "Always assume the best of intentions from others," goes the first rule. Siilasmaa and his board knew that they had to instigate change but what kind would it be?

"We started a scenario analysis and checked out all possible alternatives. It was like a tree: some branches were cut off but new ones were growing to replace them."

Fellow board members praise Siilasmaa for his ability to ensure that everyone has their views heard and even the most difficult topics are openly discussed.

"I knew Nokia was a turnaround story but I didn't know how bad things were before the first board meeting," says Bruce Brown, former Procter & Gamble CIO. He joined the board when Siilasmaa started as chairman. "Risto has done an amazing job managing the board and never avoids tough challenges."

"Curious, tech-savvy and a little bit idealistic, at least compared with me," says Jouko Karvinen, former CEO of Stora Enso a Finnish pulp and paper manufacturer. "He puts more time and effort into the job than any other chairman I've met. He's not into formalities and he's not trying to walk on water, which is good."

Negotiating with Microsoft

The next big deal happened before the sale of handsets was announced, but the two were intertwined. When Nokia was negotiating with Microsoft about the deal, it also managed to get a loan from the prospective buyer.

"This was the funding Nokia used to buy back the Siemens share of NSN. We had an agreement that we would have got the money even if the handset deal didn't go through," says Siilasmaa.

NSN had been struggling for several years after the merger in 2006, but it had eventually turned into a growing and profitable business. So it made sense to use it as the core of a new strategy. Until August of this year it was supported by two brands, Nokia Technologies, which describes itself as "a leading innovator of the core technologies enabling the Programmable World, where everything and everyone will be connected," and, until August of this year, its mapping and location business HERE. But then Nokia sold HERE to a consortium of German carmakers for US$3.07 billion allowing it to focus on the Alcatel-Lucent acquisition.

During his term as chairman, Siilasmaa also served as an interim CEO for eight months in 2013-2014. The sale of the handset operation to Microsoft was then in progress. It had been announced that CEO Stephen Elop would be switched to work for Microsoft once the deal was concluded, and the search for the new CEO was under way. →

> "Curious, tech-savvy and a little bit idealistic"

"As CEO it was my goal to achieve five distinct objectives: create a new vision for Nokia, build a strategy to implement the vision, choose the right organisational structure to drive the execution of the strategy, pick the best CEO to lead the organisation, and announce what kind of a balance sheet we would be aiming at."

With Networks as the core of the new Nokia it was natural that the former CEO of NSN Rajeev Suri should be elected to lead the whole company. "We want people with not only professional skills but also an understanding of our corporate culture," says Siilasmaa.

The first meetings with Alcatel-Lucent took place already during the closing period of the Microsoft deal, but the board carried out another rigorous analysis process and went through all other possibilities as well.

Understanding networks

Siilasmaa believes the deal is driven by changing customer needs. As in many other businesses, even the network operators will in future buy service as a whole rather than separate technologies. For Nokia this means that it needs to have a deep understanding of all kinds of networks. So far it has been a specialist in mobile broadband networks.

"We're not primarily looking for economies of scale but economies of scope," says Siilasmaa. "With Alcatel-Lucent we have created the only company with significant global business on all the different network technologies: fixed and mobile broadband, internet routing and software defined networking and cloudification."

The €15.6 billion Alcatel-Lucent deal is the biggest in Finnish business history. "What we need to do first," says Siilasmaa, "is get through this interim period as fast and efficiently as possible. The longer it takes the more painful it gets," obviously remembering how the closing of the Microsoft deal lingered on and on.

When the deal is done, Nokia is determined to avoid the problems it met with Nokia Siemens Networks merger, when both parties were treated as equals and different corporate cultures clashed head on. The aftermath lasted for years and business suffered.

"We didn't want a merger of equals, this is a buyout. We are going to seek the best solution to any problem based on meritocracy, and not pay attention to nationality. The decisions will be made under clear governance: the chairman and the CEO will come from Nokia."

Market reaction to the proposed deal was not overly positive and slightly disappointing Nokia Q1 earnings right after the news ensured that the stock price went down. But Q2 profit was back on track: it exceeded expectations and all three business units were doing well.

Siilasmaa says short-term stock price changes don't affect Nokia's strategy.

"This deal is based on a careful analysis of the expected market dynamics over the next 10 years. We are participating in a marathon not a 100 metre race."

Heidi Hammarsten is a business journalist based in Helsinki

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OPINION

ASLEEP at the WHEEL?

ANDREW MACLEOD says that there is no industry or environment immune from disruption and that the rate and pace of change is only increasing

We are currently living in an era that is hyper-disruptive and the pace of that disruption is significantly increasing because the environment is now much more conducive to disrupting existing modalities and ecosystems.

For me, that is evidenced by the ongoing rate of change we are seeing in... so many industries, that I wouldn't know where to begin. There's a universality associated with disruptive environments. At the core of it a business builds an economic construct around a certain set of conditions or certain value proposition sets, and then all of a sudden that model is disrupted and a new way of doing things arrives, or a better way of doing things arrives, and in a period of time – short, medium or long – that new way of doing things achieves dominance, invades the ecosystem and leaves existing players to ask: “how do you change the wheels on your car when you're on the highway?” That's enormously difficult to do.

It's a huge amount of cultural change and that is why it has to start from top. You must set a mandate and you must be willing, because inherent in disruptive environments is that you don't always know the next new thing – so there are always going to be failures. For the CEO and the Board it is an existential crisis: they (the Board) have to face the fact that their current model has been disrupted. Then you have to embrace this notion of how you re-architect and almost disrupt your own model. Without that alignment it doesn't really matter what you do because if you have factions in the business – with some supporting the move to the new world and some supporting staying with the status quo – you get these internal battles which just makes things worse.

However I recognise it takes an enormous amount of courage and it is hard to pick the right moment.

In a sense you have to emulate what start-ups are doing – if you don't have that alignment and courage that starts at the top it just won't work. Once you have that there is still no guarantee because you still have to reinvent your whole business model. But at least you have a chance. Start-ups don't have any baggage. They have an environment where they might throw 10,000 seeds on a field and only one or two germinate – that's a start-up environment. Whereas incumbents don't have that luxury, they have to maintain a certain revenue stream while simultaneously reinventing themselves.

I like to say to the people I work with, particularly younger people, that they are living in the age of disruption. When we look back 100 years from now they are going to look at this era and say “this was the age of disruption”. What's happening in technology first started there but now it has been propagated into every industry.

Today all of the industries that thought they had safe harbours, they are ripe for disruption. Look at what Apple or Google are doing to the banking industry or the auto industry – or what they are about to do. The jury is out as to whether or not they will be successful but I would certainly say that these traditional industries thought they had models of operation that were safe and stable. That is their Achilles heel, because the disruptive players will say that gives them an advantage because some of these industries are asleep at the wheel.

For me, it's the maturity of the technology platforms that allows for anyone to do anything in different industries – and you don't have the old barriers to entry like capital and regulation. Every industry is going to enter its own disruptive phase so you might as well get good at managing through it.

For example, if you are building keyboards and smart phones and you think you have a business around that and all of a sudden touch screens became the thing, by the time you realise that you have to embrace that then typically it's too late and you have to look at where it's going next.

You can't swim to the place that has already been disrupted because by the time you get there your rival already has it covered; you have to think about how to disrupt the player who has just disrupted you.

In the newspaper industry I work, for 150 years it was essentially a vertically integrated monopoly that had a massive revenue stream around print and print advertising. Then the Internet came along and created an environment that was ripe for disruption because the Internet breaks the distribution monopoly you have around content creation. Now anyone can create and publish content.

Out of that came Google aligning advertising around search and from there you have players like Facebook, Snapchat and so on and increasingly the revenue migrates to these platform players as they have a new and better way of reaching audiences than the old system was able to provide.

I spent over a decade at Blackberry and within seven years we completely disrupted the mobile phone industry and we ate everyone's lunch; and then in another three or four years we had our lunch eaten. You see it with Google, which is looking over its shoulder at Facebook which is looking over its shoulder at Snapchat... just by the fact that you can disrupt an entire industry the same preconditions allow someone else to disrupt you.

Whichever way you look at it technology by its very nature is a disruptive force because you are using technology to create a new way of doing things.

Andrew MacLeod is Chief Operating Officer at Postmedia, one of the largest newspaper and media conglomerates in Canada

ILLUSTRATION BY EVA TATCHEVA

VIEWPOINT: Richard Boggis-Rolfe

CHAIRMAN, ODGERS BERNDTSON

There are disruptive forces in the Executive Search market as in other industries and networking databases have thrown challenges at the industry. However the art and science of Executive Search, particularly as practised by Odgers Berndtson, is a great deal more than a database. Top tier searches require a high degree of personal service, insight and business understanding. We call this ‘intelligence’ in the sense used by the Intelligence Services – and it cannot be delivered by machines.

Flat world navigators

KIM TAYLOR MCDONALD on how strategic collaborations are leading to dynamic win-win solutions

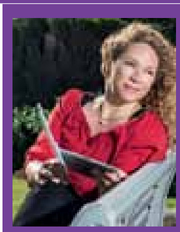
In this era of the hyper-connected, global DACE (Digital, Attention and Collaboration Economies) every individual and organisation is under an increasing demand to do more with less – less time and less money. As such, a strategic disruption of the traditional business model is beginning to take place – as it must for all enterprises, regardless of size, locale or profit/non-profit status. This disruption equates to a shift away from the armour construct of a 'command-and-control' model to one which focuses on dynamic, collaborative, win-win solutions. It is through these strategic and effective collaborations that profits, both tangible and intangible, will be made.

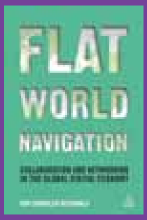
FLAT WORLD

Collaborative endeavours – be they cross-cubicle, cross-corridor, cross-company, country or continent – and the competitive advantages being garnered through them, will increasingly take centre stage in the near, mid and long-term future of the 'flat world' of the DACE. However, key to these initiatives are the individuals – the Flat World Navigators – who are able to make and maintain authentic bridges, as it is through their strategic business relationships that bigger, better brands and businesses will be built.

Through the use of the relationship nodes of online connections and working collaboratively with a network of clients, colleagues and partners one can achieve far more – including establishing a radically expanded reach, improved efficiency and innovation capacity, greater productivity and deeper insights – in less time, and with fewer costs, than going it alone. Along with creating cohesive collaborative opportunities between colleagues, clients, customers and joint venture partners both real and potential, these relationships are the evolution of networking and marketing. They are the conduits to the ever more engaged, empowered and expectant end users of products and services.

Significantly, the core KPI in this disruption to the relationship model is ROI – Return on Involvement – as sustained, authentic engagement is the best way to create a collaborative ecosystem of credibility, clarity and respect for brand, business and the bottom line.



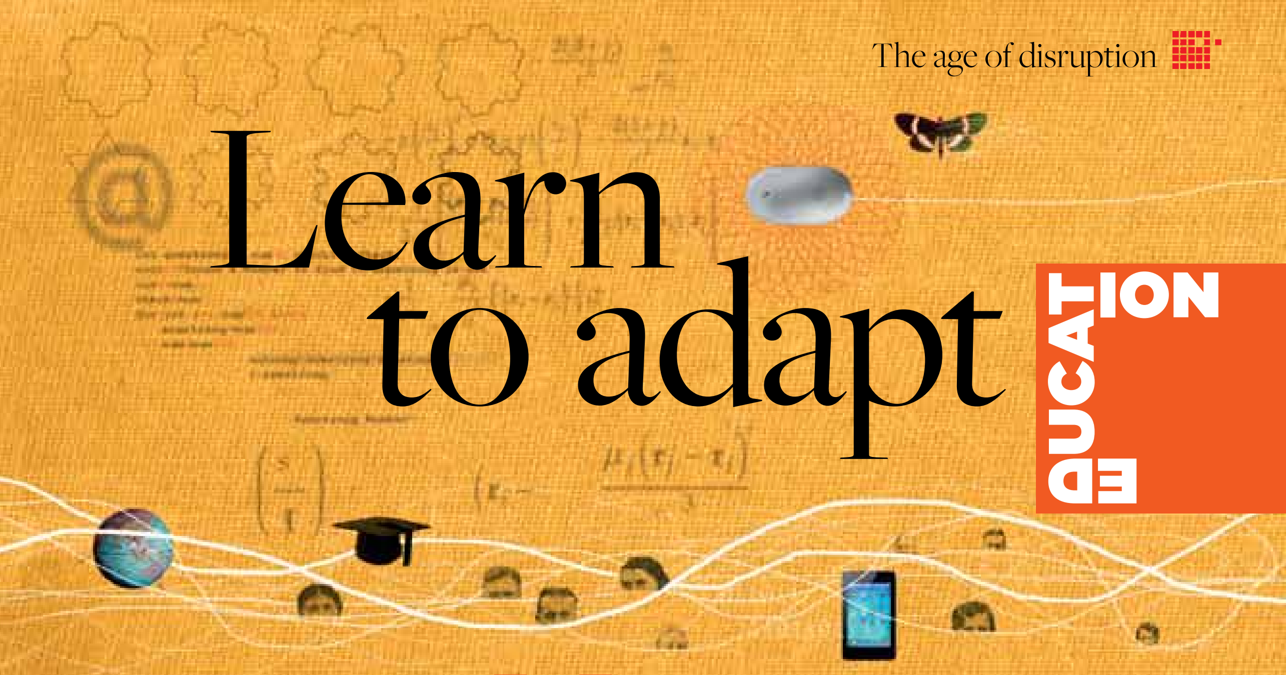


Kim Taylor McDonald is the author of *Flat World Navigation: Collaboration and Networking in the Global Digital Economy,* [2015] published by Kogan Page

ILLUSTRATION: ©IKON IMAGES

EDUCATION

Learn to adapt



With the rise of MOOCs and other online learning tools, the education industry is in a state of flux

ILLUSTRATION BY MATTHEW RICHARDSON

More people signed up for Harvard's online courses in a single year than have attended the actual university in its 377 years of existence. That staggering fact alone indicates the massive, irreversible change that's happening – happened – in education. The decline of the one-to-one university tutorial with sherry on the side has been matched by the explosion in online learning, a global business that Forbes says will be worth US$107 billion in 2015.

E-learning is a broad category, encompassing everything from Harvard degrees to online corporate training, the latter market is expected to grow by 17 per cent a year to 2017; apparently 77 per cent of US companies now provide online corporate training to their employees. In the UK more than 20 universities now give free online courses under the aegis of FutureLearn. When Edinburgh University offered its own MOOCs (massive open online courses) through a US network it quickly had more than 300,000 students sign up – more than nine times the number actually attending the university. Coursera, which started as an alliance between Stanford University and two dozen others and now boasts 122 partners, claims it has more than 14 million students signed up. All those millions of students – about two-thirds of whom don't live in the US – have their →

TERTIARY ENROLMENT: PAST AND FUTURE

In 2000, there were 99.4 million students enrolled in higher education institutions. In 2030, research expects this number to rise to 414.2 million

THE FUTURE IS HERE

Enrolment in HarvardX courses as percentage of global enrolment

Afghanistan	**0.0%**
Bangladesh	**0.3%**
India	**8.2%**
Nepal	**0.2%**
Pakistan	**1.0%**
Sri Lanka	**0.1%**
Australia	**2.2%**
UK	**4.4%**
US	**34.9%**

CURRENT DEMAND OUTSTRIPPING SUPPLY

Number of A level students per available university space

Afghanistan	**3.58**
Bangladesh	**4.79**
India	**1.49**
Nepal	**2.39**
Pakistan	**1.13**
Sri Lanka	**4.89**

Source: HarvardX

EDUCATION

progress tracked, logged, studied, and at the end gain 'a statement of accomplishment' from the course tutor. Martin Bean, vice-chancellor of the UK's Open University, a leader in distance education, has said: "Time and again we have seen the disruptive impact the internet can have on industries – driving innovation and enhancing the customer experience. I have no doubt MOOCs will do the same for education."

Online education is not a particularly new phenomenon. In the US around one million full-time students are enrolled in distance learning programmes, rising from less than 10 per cent in 2002 to more than 30 per cent today. What's distinct about e-learning today is scale; we are poised on the cusp of a truly revolutionary change, driven by several factors: demand for education, insufficient supply of places to study, and cost. The biggest markets for both commercially oriented and degree courses by far are India and China, where conventional university tuition costs are prohibitively expensive.

The rise of MOOCs

Around 25 per cent of the US population is enrolled in some form of post-school education programme – making accessible quality instruction online an efficiency that is only now being understood.

Clayton Christensen, the Harvard Business School professor widely created with inventing the term 'disruptive innovation', said that disruptive technologies find success in markets where "the alternative is nothing". In his view e-learning is just going to keep on spreading and improving.

MOOCs generally arose out of universities' interest in computer intelligence. The ultimate goal might be software that maps an individual's knowledge and offers e-learning plans specifically designed to plug the gaps, whatever those might be.

But while work on the technology to develop that kind of customised individual e-learning is proceeding, e-learning's biggest potential is surely the chance of bringing world-class education to those who otherwise couldn't afford it. Take, for example, Kepler, a non-profit university programme for the developing world, which has a pilot campus in Rwanda. It has what it calls the 'ambitious target' of providing an "American-accredited degree, a world class education… for thousands of students for around US$1,000 tuition a year." Naturally there are numerous entrepreneurs involved with e-learning, such as Shai Reshef, who is credited with starting the first online university outside the US in 2001, based in the Netherlands. His creation, the University of the People, aims to provide high quality online education for everyone, free of all but the smallest of charges (to sit exams).

There may be drawbacks to e-learning and certainly Christensen has his critics, such as Jill Lepore, a staff writer at *The New Yorker*. In a piece called The Disruption Machine she wrote that "disruptive innovation is competitive strategy for an age seized by terror… Disruptive innovation as the explanation for how change happens has been subject to little serious criticism, partly because it's headlong, while critical inquiry is unhurried; partly because disrupters ridicule doubters by charging them with fogyism, as if to criticise a theory of change were identical to decrying change; and partly because, in its modern usage, innovation is the idea of progress jammed into a criticism-proof jack-in-the-box."

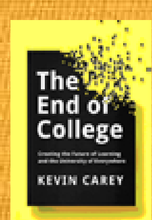
What lies ahead

In a thoughtful piece on Quartz Rob Huntington argues that "it is ultimately the student and teacher working together that yields deep learning and growth". True enough; and perhaps a video course on cryptography (as offered by Coursera) attended by thousands might not be great at personal mentorship. But once the jack is out of the box it's difficult to put it back. Executives of the next generation would do well to prepare themselves to be able to scrutinise CVs not just from familiar universities, but from MOOCs everywhere – you wouldn't want to miss out on talent just because the degree isn't from Harvard.

ONLINE LEARNING FACTS (COMPILED BY THE ODGERS BERNDTSON INFORMATION UNIT)

- The market for online learning products hit US$42.7 billion in 2014 and is expected to pass US$50 billion by 2018 [Source: *University World News*, 'Huge Growth in e-learning in Asia', 2014]
- Asia's desire for online degree programmes growing faster – at 17.3 per cent – than anywhere else
- Growth in Nepal and Pakistan rose to more than 30 per cent in 2014
- Most Ivy League universities have fully adopted MOOCs but many top UK universities have preferred to retain their traditional teaching methods [Source: BBC, 'Massive Open Online Courses: Threat or Opportunity?", 2013]
- SPOCs (Small Private Online Courses) delivered on MOOC-like platforms have also proved their effectiveness: According to Anant Agarwal, CEO of Harvard's EdX, "60 per cent of students at San José State University passed its traditional electronics course, but when a SPOC was introduced the pass rate rose to 91 per cent."

Further reading: *The End of College: Creating the Future of Learning and the University of Everywhere* by Kevin Carey (Riverhead Books, 2015)



VIEWPOINT: The rise of Bleisure

Jonathan Openshawe

ON RECOGNISING THAT THE DIGITAL 'MILLENNIAL' MUST BE SEEN AS A NEW KIND OF WORKER

Work

Technology has profoundly disrupted the workplace, and this goes deeper than replacing fax machines with cloud computing. The digital Millennial is a new kind of worker who no longer looks for a job for life. Instead of long-term security and benefits, members of this generation are motivated by a lifetime of learning and personal advancement, and seek specific roles and job titles that add to their personal portfolio.

One of the trends that define this generation is Bleisure, which LS:N Global has been tracking since 2009. Rather than seeing business and leisure as opposing forces to be kept in check – as their parents' generation may have done – Millennials are seeking a more seamless life experience that can combine both. Technology facilitates this need. A recent Harris Poll study revealed that Millennials conduct 26 per cent of their work on mobile devices, while 42 per cent already own or plan to buy a wearable device, and 95 per cent of these plan to use these devices for work tasks.

With the rise of Bleisure, we have also seen how the principles that Millennials apply to their personal lives are migrating to the workplace. Rather than work being a necessary evil, it has become an opportunity for them to actively improve themselves and their community, and even to tackle global inequalities. Deloitte has found that 68 per cent of Millennial workers think their businesses should do more to address resource scarcity, while 65 per cent expect them to tackle climate change and 78 per cent will decide on a job offer depending on how innovative they perceive a company to be.

Millennials are no longer happy to serve as cogs in a corporate machine, but want to present themselves as brands in their own right. Digital Millennial workers are flexible and collaborative, preferring a modular working structure that changes with each new project, and introduces them to new skillsets and contacts. They are highly motivated by transferrable pay-offs such as job titles – anything that is as mobile as they are and that can be carried with them to their next role. And this will come sooner than you might like: they are not a loyal demographic, and tend to move on after months rather than years.

Instead of trying to fight the less appealing characteristics of Millennial workers, employers need to start understanding them better and working with their strengths. Rather than pinning them down into specific long-term roles, a trend towards job-sharing and long-term temporary projects is emerging. Full-time employees may begin to make up a diminishing proportion of the workforce, and the role of the people manager (that's Millennial HR) who can quickly bring together the relevant skillsets is on the rise.

Jonathan Openshawe is Editor of LS:N global at The Future Laboratory

DISRUPTION

The view from Odgers Berndtson

With 52 offices in 27 countries Odgers Berndtson has a direct line into the thinking of Boards and C-suite people across the globe. Here are some of the diverse views from Odgers Berndtson partners on the Age of Disruption

VIRGINIA BOTTOMLEY

Chair, Board Practice at Odgers Berndtson Global

There has been a profound transformation in what we do and how we do it. Technology has revolutionised the workplace, requiring different skills, potentially releasing intellectual energy and rapidly increasing response rates and communication.

The feminisation of the workforce is growing at pace. Within my lifetime I've seen the first woman prime minister, leader of the Commons and the Lords [in the UK], FTSE 100 chairperson, chairperson of the World Bank and the IMF, and even Chancellor of Germany. The contribution of the female workforce is beyond all expectation and will only grow.

We've also seen attitudes to work and careers transform beyond recognition in a generation. Few now expect a career for life, work is considered in phases or stages related to what the individual expects at different points. There is also an expectation that work in itself is fulfilling and rewarding, with employees wanting to have pride in the business or the organisation where they are occupied and employers really need to understand that.

Lastly, the ageing population means that the conventional approach to a career from 20 to 65 will never be the same again.

We all have to embrace change and not resist or be fearful of it. At Odgers Berndtson we practice what we preach. Our technology is advanced, the composition of our workforce is diverse and we work to give people a sense of value and worth in their occupation. By embracing the forces of disruption we are able to better serve our clients and assist them on their journey.

KESTER SCROPE

CEO, Odgers Berndtson

We embrace disruptive forces. The speed and impact of change is irresistible, accelerating and the opportunities that it opens up are exciting. Companies that win tomorrow will be those that exploit knowledge by having the right expert teams in the right places and that can adapt quickly. Our role in supporting our clients in employing the right leadership skills within this environment comes with great responsibility. It affects lives and companies more than ever.

The new world requires us to have global reach and expertise across sectors in the economy to access the best possible talent. As a global company working collaboratively to harness our cumulative knowledge, network and reach on behalf of our clients makes our job more exciting than ever.

MARK BRAITHWAITE

Managing Director, Odgers Berndtson ***Asia Pacific***

For most, the concept of disruption links directly to technology. Technology advancements enable new business models to displace old business models. This is nothing new as technology advances have been consistently changing the business landscape since the discovery of the wheel. The difference now though is that speed of change is outpacing the ability of our organisations to adapt.

What most executives do not yet see is that an even bigger factor is about to compound the disruption challenge. The workforce is shrinking in just about every economy relevant to global businesses. The demographic tipping point that brings this problem to our front door is already here and is forecast to worsen every year until 2050. We are facing a gaping hole in the global workforce and the war for talent is about to intensify.

For companies wrestling with the changes that technology disruption brings, employer brand is critical for attracting and retaining talent. As brilliant as the new strategy is for the future, execution without the right people is a sure path to failure.

Odgers Berndtson has faced its own disruption. We have evolved to providing solutions to the complex leadership challenges faced by disrupted organisations. This goes way beyond the recruitment transaction and has a true partnership role. We call it Search Intelligence.

As one of our clients recently said: "We are hiring on potential. Our market has changed so much there is nobody out there who has done this. It's a new world as a leader."

HÅKAN EKSTRÖM

Managing Partner, Odgers Berndtson Sweden

Disruption for our industry means we have to deliver more value around *every* candidate, not just a CV that fits the profile. Focusing on a candidate's true performance, leadership style and so on becomes even more critical. Equally, the value that we bring at the early stage of an assignment needs to be top notch. This includes forming the profile based on the future challenges for the company, i.e. a true understanding of what competencies are needed for that company or industry going forward, which in turn leads to increased specialisation. However, it also means knowing where that talent and knowledge can be found. So we need to understand other industries as well. Being able to find the talent and/or skills that are not present in an industry, and bring it to them from another is a real 'value add'. Companies cannot easily do this themselves, but executive search firms with knowledge of a multitude of industries can.

ROMAN TYSHKOVSKIY

Managing Partner, Odgers Berndtson Russia

The way we consume information has changed dramatically in recent years, with the volume of information flows increased at least 15 times. But the problem is that our brains cannot change that fast and is still adjusting to these changes. That involves losing attention, becoming distracted by different communication channels and ultimately forgetting key things. People who are open to different information sources 24/7 don't even have time to think over what they are looking at and analyse it in depth. That seems to be a really significant disruption and it is still not obvious how to manage it. And that is a big challenge for every manager: how to maintain and increase human capital productivity and efficiency. I've noticed that every meeting without any gadgets is much more efficient than a meeting with people who never stop using their devices. Modern technologies create fantastic opportunities but the efficiency goes down! That is the challenge disrupting all the previous modes of communication. And working on a new communication behaviour, a new managing model is a priority not only for human capital industries, but for every manager who strives for efficiency. →

SEARCH

DISRUPTION

AYSE OZTUNA

Managing Partner, Odgers Berndtson ***Turkey***

We are being disrupted in numerous ways: not just by technological advances but through globalisation, digitisation and other activities.

Yet we also see disruption as innovation, a positive force. Because innovative disruption leads to new working and business models, it is vital that we understand this new order as we work with clients and candidates. So we use tools, methods, science to help us reconsider our value proposition and to position ourselves as trusted advisors to our clients.

We adopt a smart, intelligent approach because we know that today's talent is more connected, more informed, more mobile than ever before. They are open to opportunities but are also very fluid. In Turkey we have a very young talent pool and it will remain so for the next 10 years. We have a special responsibility, at least in an emerging market like Turkey, to deeply understand this new – and rapidly evolving – group. Quite simply, if you cannot adapt you cannot survive.

MICHAEL MELLINK

Managing Partner, Odgers Berndtson
Netherlands

The disruptive age is having a significant impact on human capital trends. Technology such as social media has already altered business models, the way that society is organised, and also the way in which you can find people. We've quickly changed from a closed society to an open society.

Many employers are now using search engines. It has become standard to 'Google' people or search them on Facebook or LinkedIn during the recruitment process. It has actually become a very effective way to discriminate, which in my view means that there is a real ethical struggle accompanying this disruption.

Now people open up their lives on the Internet, making it easy to gain access to data that is no longer private and that has a great effect on human capital trends.

We've had to change and adapt because there is more open access and more data available for all of these potential candidates. LinkedIn can be used almost as a phone book now, so it means that it is not very easy to make a decision between who is the best person for the job.

However, companies are finding it is not the best way to recruit. We're seeing that they realise that the best thing is to come back to an executive search company like Odgers Berndtson to do the job properly. We have the experience and knowledge to really find out who is the best fit for the job. And that point is becoming increasingly important in a world where people can be approached every day by email or LinkedIn.

STEVE POTTER

Managing Partner, Odgers Berndtson ***USA***

When it comes to the disruption of business models, North America is leading the way. Recently, John Chambers, the outgoing CEO of Cisco, a worldwide leader in information technology, predicted that as many as 40 per cent of companies that exist today will no longer be in business in 10 years' time. The message from Chambers: "disrupt or be disrupted." Google's announcement that it is going after the car business is just one example of how all industries will be affected. The need for innovation and challenging the status quo at the board and senior executive table has never been greater. Companies need different perspectives and out-of-the-box thinking to help them look forward and rethink their business model. As trusted advisors to many Fortune 500 companies, we believe that disrupting the traditional leadership model will determine whether companies adapt and thrive in this new environment. The 'same old' simply won't cut it anymore. Disruption is here to stay.

KLAUS HANSEN

Managing Partner, Odgers Berndtson ***Germany***

You can find both positives and negatives in disruption. The key point from our perspective is that the growth in disruptive technologies is making our candidates far more transparent. And by transparency I don't just mean being able to see their employment history, but rather if they have done things that perhaps they should not have done.

Disruption has made our work easier in some respects as it has enabled us to speed up parts of our process that are not related to initially assessing the candidate, such as generating candidates, inviting them to interview and collating information about them. All of this work is far more efficient because now we have so much more that we can easily store, sort, look after and manage.

I recently celebrated my 20th anniversary at Odgers Berndtson and if I look back to my early days our key service to our client was to find candidates. That was our real asset – to know where the good candidates were.

Today this is almost completely irrelevant because this part of the service can be done by anyone and is far more accurate and far more up to speed than it has ever been.

This has dramatically changed our business model because today our value added service is the assessment of the candidate to check their cultural fit. To find candidates is a commodity, a no brainer, but to offer that value added service of ensuring they are exactly right for the business is the real skill.

Conversely if the universe of candidates is much more transparent then our clients believe that they can do their own recruiting.

The more general expertise and knowledge that people have, then the less important is the assessment of the personality. If you're looking for an SAP consultant for example, it is not really critical what their character is like as long as they know SAP.

On the other hand, if you're looking for a board member, which is our core business, the expert knowledge is almost irrelevant and the personality is absolutely paramount for making a good candidate.

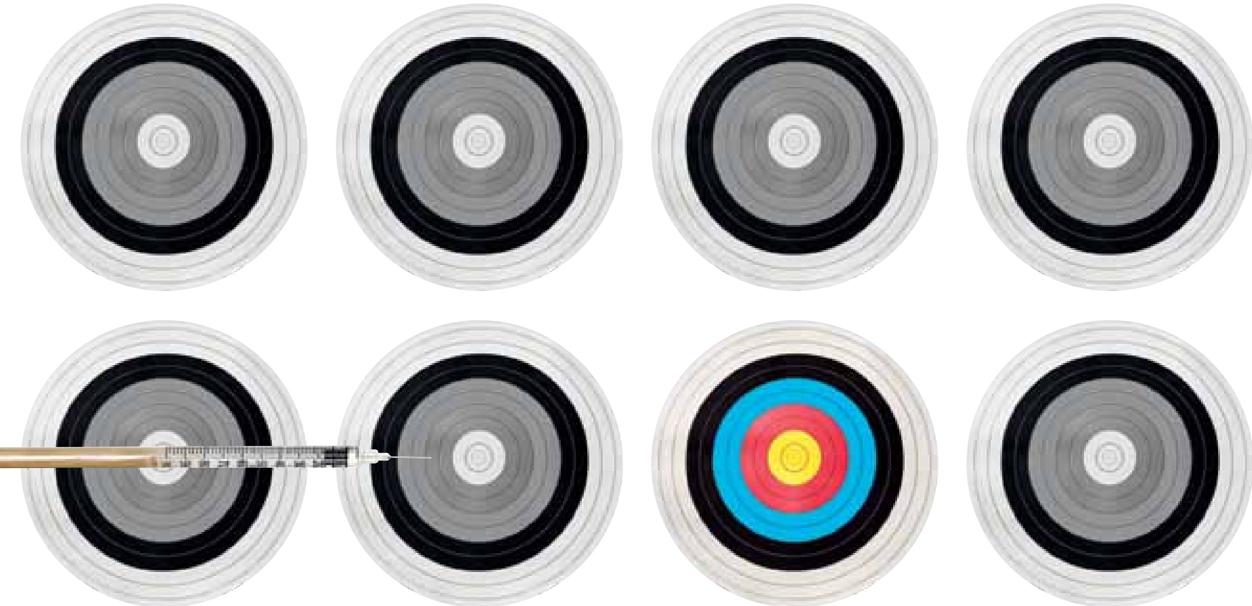
For that reason assessment of the candidates has become crucial. At the upper end of our services our business is still very healthy because the recruitment agencies and HR departments of our clients do not have the experience to operate in that senior level.

If you are able to create your own profile on LinkedIn then you are able to push it as you wish. Candidates are increasingly fine tuning the information about their career that is visible on the Internet, which puts incredible responsibility on us to ensure that all the information is correct and, most importantly, can be proven.

PATRIK KVIKANT

Managing Partner, Odgers Berndtson
Finland

Disruption in business life is increased by both digitalization and globalization. It is visible today and will become stronger in the future. This directly effects the required leadership competencies for top executives. The ability to make fast decisions with limited amount of information becomes a necessity. It is likely that there will be less room for 'pure growth' leaders that only perform well during upturn phases. The ability to renew yourself and your business becomes more and more critical. Good leaders must demonstrate this continuous behavioural pattern in their daily work as safe career environments and long careers are most likely gone for the foreseeable future. Companies, and more specifically boards, must be alert and evaluate the CEOs competencies constantly because of the increasing disruption around us. Today your CEO is spot on for your needs but they can quickly become the wrong person because of sudden market changes caused by disruption.



THE AGE OF PRECISION MEDICINE

LIFE SCIENCES

JOHN JAKENFELDS and DOUG MORRISON look at the disruptive forces at work in the life sciences arena and the extraordinary research being carried out that will revolutionise medicine

These are heady days at the R&D end of healthcare with what seems like a constant drip-feed of news on breakthrough drugs. Yet the latest buzz around this sector turns not so much on the underlying science but a new approach to delivery – precision medicine.

This is all about tailoring medicine to specific patient groups and consequently making healthcare more efficient, both medically and financially.

"The aim is to get personalised drugs and therapy to the patient faster and more cheaply. The patient becomes the centre of everything," says John McKinley, CEO of Precision Medicine Catapult (PMC), a new agency established by the UK government to accelerate the introduction of products and services.

Precision medicine is essentially a refinement of the already established area of personalised medicine, harnessing the disruptive therapies and innovation from pioneers such as Roche (see sidebar) but with greater use of computer technology.

"It comes from big data in the first instance and what you are producing at the end, are new therapies, new vaccines, new drugs," says McKinley.

And as he suggests, it is 'a golden age' of discovery, with all the advances in such areas as epigenetics and immuno-therapy. When PMC was launching a UK-wide network of innovation centres, Oxfordshire-based Immunocore raised £205 million (US$340 million) in the →

ROCHE

A small number of pharma companies account for the lion's share of personalised medicine and one of the undoubted disruptors here is Roche with a total of almost US$20 billion in sales from its targeted drugs.

The Swiss group identified personalised healthcare as a key business strategy as long ago as the mid-1990s when its big corporate play was to have diagnostics and pharmaceuticals together under one roof.

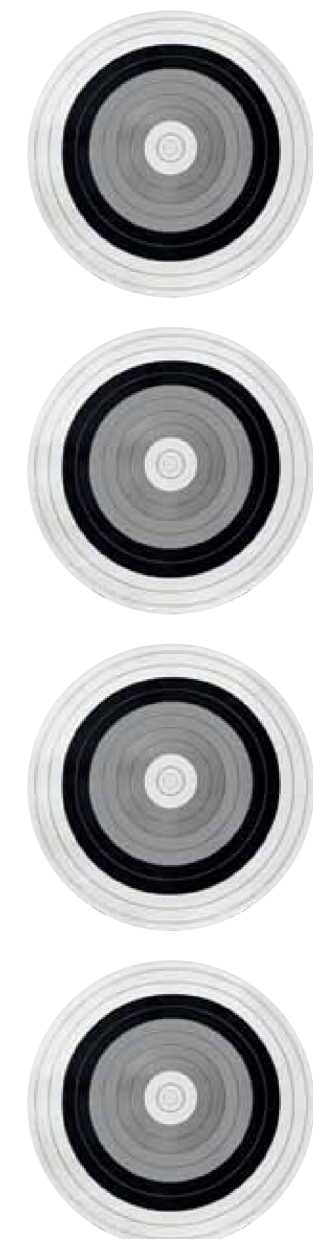
According to Roland Diggelmann, Roche's COO Diagnostics, this twin-track approach gives the group "a fundamental advantage" over its competitors in an area of healthcare that customises medicine for specific patient groups, if not yet for the individual.

"In simplified terms you're looking for a genetic mutation or genetic status and then you can tailor the medicine, and then you know that the response rate for that particular group is going to be higher than for the general population," he says. "This is the approach of personalised healthcare and it's a compelling approach. The more you know the better you can treat. The basis to that is, of course, the gathering of information and a big part of that is the diagnosis."

He continues: "In medical terms, we say the targets come from pharma and the diagnostics picks this up and sees where we can find the so-called bio-markers, anything in blood or tissue which would indicate the validity of this hypothesis. So we work together very early and we have advantages because we work without boundaries."

One of Roche's early breakthroughs was Herceptin, a drug that targets the HER2 genetic mutation in a particular form of breast cancer. Global sales of Herceptin in 2014 alone totalled CHF6.3 billion (US$6.4 billion).

"Personalised healthcare is very much a reality," he adds. "It's going to increase in importance as we continue to make scientific advances, we understand more about the individual patient make-up, about how biology works and all the molecular information. And that ultimately leads to more and more tailored medicines. This is exactly what modern and future medicine is all about – having the best possible understanding of a patient's situation and then having the ability to select treatment."



biggest private financing of a European life sciences company, reflecting the expectations around immuno-oncology.

With health services worldwide strapped for cash and resources, the stakes are high. PMC estimates that precision medicine is already worth US $14 billion in annual sales worldwide, and it is forecast to reach US$50-60 billion by 2020.

"There's a universal recognition that the healthcare models of the past 50 years will not be able to sustain the changes in the industry over the next 50 because of innovation, new technology, new diseases happening every day," adds McKinley. "Healthcare has to move more towards the individual."

John Jakenfelds is the Global Practice Leader for Life Sciences at Odgers Berndtson; **Doug Morrison** is a business journalist

LIFE SCIENCES

"Healthcare has to move more towards the individual"

IMMUNOCORE

There is genuine excitement surrounding immunotherapy – drugs that harness the body's immune system to fight cancerous cells – and one UK company is a leader in research and development in the field – Immunocore.

Oxford-based Immunocore is well known in the biotech world following high-level partnerships with the likes of Roche, AstraZeneca and GSK. But in July this year the company's profile soared to a new level of public consciousness after raising £205 million (US$340 million) in Europe's largest private life sciences financing.

Leading institutional investors piled in because Immunocore's main drug – IMCgp100 – has shown huge promise in trials on patients with melanoma. In effect, the drug enables the immune system to recognise and kill cancerous cells it would not other wise recognise and, as a result, offers a nine-fold increase in success rates compared with conventional cancer therapies.

Immunocore's so-called T-cell receptor technology, is described by Chief Executive Eliot Forster as a "potential game-changer" within the field of immuno-oncology – itself widely acknowledged as the biggest advance in cancer treatment for a generation.

"We don't think that this will be the only way of treating cancer but it certainly, we believe, will be an important component in treating cancers," he says. "This technology is rather like the development of monoclonal antibodies in the '80s and that started in a very narrow area and eventually has gone on to be the most widespread drug classes available today.

"We believe that this technology has many parallels to that. We've started our work with oncology but we've already announced we have a collaboration with GSK in anti-virals and we're also interested in auto-immune diseases."

Now in late-stage development, Immunocore's breakthrough skin cancer drug could be just three years away from widespread usage following the fundraising.

Forster adds: "The sad fact is that though huge progress has been made in the treatment of cancer over the last 20 years, it really has only been baby steps and the quality of life of patients and the expectation of life still leave a lot to be desired. There's a real opportunity for these patients and we believe we can help."

VIEWPOINT: The culture of change

Fraser Thompson

IS DIRECTOR, SINGAPORE, ALPHABETA STRATEGY X ECONOMICS

It's easy to get lost in change. Whilst the changes taking place are immense, a set of simple yet powerful questions are useful to test your readiness to manage this new environment:

Can you confidently name three to five economic events that pose the biggest risks or opportunities to your business? Are they different than a few years ago?

Are you clear about the first-, second-, and even third-order impacts these forces could have on your business?

Does your management team have an action plan to respond to these events and to shore up any vulnerability before it occurs?

Have you identified leading indicators to monitor and agreed on trigger points at which you will reassess your strategy?

Do you have the skills (and culture) in your organisation to navigate this changing landscape?

Since the start of the 21st century, the world has been changing radically with Asia-Pacific at the heart of the transformation. All at once, emerging economies are rapidly industrialising, populations are aging, new technologies are coming into use, and a growing web of interconnectedness is transforming geopolitics, the competitive landscape, and sustainability concerns.

None of these disruptions, on its own, is a surprise. The unique challenge is that they are happening at the same time – and on a huge scale, creating effects that are scarcely possible to anticipate. The 'rules of the game' have changed fundamentally, and business and government leaders will need to reset their intuition or risk being left behind.

The major consumer markets of tomorrow will look very different from today, but this will create both opportunities and risks for consumer-facing companies.

FUTURE

THE RISE OF THE TECHNOLOGY ALCHEMISTS

DAVE COPLIN, Chief Envisioning Officer for Microsoft UK, believes that predicting future technological developments in a disruptive age requires a combination of alchemy and a pinball machine

Since the beginning of time, our natural instinct has always been to create new things in the image of old things. This is one of the main barriers preventing us from making the next leap to how technology can transform our lives and our businesses. When all we see in front of us is a straight line projected from our past, we're actually missing a huge part of the picture.

Here's an example to illustrate the point. Driverless cars are an extraordinary technological development. There have been some amazing test cases that help cement their place in our minds as the 'future of transportation'. But in reality, I would argue that driverless cars are a pretty obvious progression that are steeped in our past rather than our future and as a result I am yet to be convinced that they are in fact, the future of driving.

The latest estimates show that the development of fully autonomous driving – where all of the driving not just the motorway miles and the parking – is done by the car and not the driver is still a long way off. Recent data indicates that it won't be until 2040 when 50 per cent of all miles driven are driven autonomously, and it won't be until 2070 where that number reaches 100 per cent.

Just think about that for a moment. Think about what else might have happened by that moment in time. I wonder if in 2070 we will still be thinking that the best way to move people around in our society is inside a robotic metal box with wheels.

Essentially, all that's happened is that people have predicted the future of automotive transportation by simply looking at the past, linking it to what we do today in the present and connecting the two points together such that the line can be extrapolated to give them the answer for the future.

The age of the drone

But that approach is really narrow minded. It implies that nothing else will happen that may affect or supersede this development. History has shown us that this is almost never the case especially over the long term. Do we really think that by 2070 we won't have found a better mode of transportation than the car (automated or not)?

People are already working on drones to deliver packages, how long is it before someone realises that a human being is just a bigger (and in my case, much heavier) package and we can then embark on a new route of personal autonomous drones? And what of the hover board, or the flying car or let's be honest, why on earth are we still looking at this in terms of vehicles when surely the answer is the StarTrek teleporter?

The trick for making your own predictions is to remember that the future of anything is rarely ever a straight line, instead it's a lot more like a pinball, bouncing from bumper to bumper where each interaction imparts a slightly different direction and opportunity. The art lies in being able to take a really broad view of the environment that you are focused on and to look for additional factors and influences that may impart a new direction, opportunity or risk.

This process has a lot in common with the alchemists of old. They were misunderstood and judged by their societal peers as dreamers or occultists who thought that it was magic not science that held the answers to life, the universe and everything. This could not have been further from the truth. The key attribute possessed by most alchemists was merely their ability to see the future differently. Quite simply, these were people who were able to separate what 'is' from what 'could be' such that they could look beyond the current form or function to be able to see new applications or potential.

From alchemy to science

It is always worth remembering that many of history's greatest scientists started out as alchemists, and it was only through their hard work and tenacity that history showed their theories to be right such that they would finally be welcomed into the clinical, binary world of science's hall of fame.

Robert Boyle, the father of chemistry, was an alchemist first and a chemist second. Isaac Newton the genius who quantified gravitational attraction, discovered the component colours of white light and the calculus, also spent more than 30 years recording over a million words on the subject of alchemy allegedly in pursuit of the philosopher's stone. What both Boyle and Newton intrinsically knew and ultimately discovered is that sometimes the logical answers are best found out by illogical means.

I think we are entering a new period in the history of alchemy only this time it is in the transformational nature of technology rather than metals where we need to divine some magic.

Now more than ever our organisations (and our society) need a new generation of alchemists; people who can see new potential in old things. But, unlike their historical predecessors, we should not make fun or ostracise them when they make bold attempts to achieve great things that are ultimately doomed to fail but we should instead congratulate them for their audacity. ◘

VIEWPOINT: Disruptive technology

Murat Kansu, MD of Microsoft Turkey,

ON EMBRACING DISRUPTIVE TECHNOLOGY

A disruptive technology is one that shakes up an established technology and destabilises an entire industry, creating a new way of doing things.

At Microsoft we've often taken advantage of such technologies as they allow you to spread into new areas by being different and by being innovative.

Think of the personal computer. It completely and irreversibly changed the way we work and communicate. The Windows operating system, employing that combination of compatibility and user-friendly interface was absolutely instrumental in the rapid development of the PC industry.

Email has transformed the world, as has mobile computing, which disrupted the traditional way of working by allowing people to work wherever they are and whenever they want.

Most recently cloud computing has been hugely disruptive, displacing traditional resources that were in a home or business. That kind of disruption puts pressure on companies such as Microsoft, but we always aim to take advantage of new technologies as early as possible.

Our industry does not respect tradition, it only respects innovation. It has to be in Microsoft's DNA to actualise the impossible and to embrace every new and disruptive technology.

To be successful in this disruptive age you must be proactive and take advantage of technology. It's all about innovation. Establish a corporate culture based around innovation, provoke new ideas and encourage that way of thinking, creating an environment where people can bring their ideas to life. We started with Bill Gates' vision of a computer for each person and for each home. We have achieved that and now we are transforming ourselves to create more disruptive shifts in the industry.

Going, going, gone

Does a move to digital signal the end of conventional auctions?

SELLING

Is it becoming slightly passé to attend an auction in person, however high-profile the lots may be? The answer may well be 'yes'. The nascent trend in the world of high end auctions, as in so many other disciplines, is to go digital. According to the 2015 edition of the Hiscox Online Trade Report, the online art market reached US$2.64 billion in 2014, a 68 per cent rise year-on-year, and could reach US$6.3 billion in 2019. It's still a drop in the ocean – online buying accounts for about five per cent of the US$55.2 billion global art market, and much of the online commerce is less than US$15,000 an item, which upmarket auction houses have spurned, in order to maintain their high-value image.

But a trend is in place. Hiscox says that "art buyers are becoming less dependent on the physical gallery or auction house... there is an increasing level of indifference between the channels that collectors want to use when buying art. Going forward it will be critical to offer potential art buyers a choice of channels when acquiring art."

Digital disruption is hitting auction houses, where dealing with data – except for the cash register takings – has conventionally been overlooked. Auctioneers are becoming digital information managers. In 2010 Christie's hired Steven Murphy as CEO to implement its digital strategy. His background was in publishing and music but he espouses the digital world. Interviewed by the *Financial Times* in September last year, he commented: "We did research that showed our customers were living half their life, if not more, with online experiences. Even our multi-billionaire clients who were highly interested in art and objects were personally going online to study them. The imperative was clear: we needed to create a digital version of the Christie's experience in a platform-agnostic way."

Not to be outdone, Sotheby's has hired David Goodman as its new digital and marketing chief. Goodman joined the auction house from the Madison Square Garden Company, where he was the president of productions and live entertainment.

Last year Sotheby's and eBay struck a partnership which saw live-streaming auctions start in April this year. Christie's followed suit by buying the online collection management platform Collectrium. Christie's increased its number of online auctions from seven in 2012 to 49 this year. It even has an app that allows you to bid live from tablets and phones.

For Fru Tholstrup, director of S2, Sotheby's contemporary gallery space, "Instagram has become indispensable. It allows me to introduce collectors to previously unseen and unknown works of art, through shots taken on studio visits to the gallery, and has led to sales in a number of cases."

But the inability to physically inspect a work remains an issue. Hiscox says: "In 2014, 82 per cent of online art buyers (up from 78 per cent last year) say the biggest challenge when buying art online is the fact they are not able to inspect the work. In a similar vein, those worried that the artwork may appear different from its representation online has risen from 64 per cent to 74 per cent year on year." But as digital technology becomes more immersive this problem will also diminish.

ILLUSTRATION: ©IKON IMAGES

FUNDING THE FUTURE

Crowdfunding platforms such as Kickstarter have grown rapidly in recent years, offering budding entrepreneurs global exposure and funding in the process. KILLIAN FOX looks at the emergence of the sector and where it may go next

CROWD FUNDING

In November 2012, Emily Brooke launched a crowdfunding campaign to raise money for an idea she'd developed during her final year at university in Brighton. Brooke wanted to manufacture a bike light with a difference: as well as functioning like a normal front light, it would also project a green bike symbol on to the ground five metres ahead, so that drivers know a cyclist is coming up behind them.

For a 'little girl from university with a good idea' but no manufacturing experience, it would have been a struggle to raise the initial £25,000 by conventional means, but on the crowdfunding platform Kickstarter, which had just launched in the UK, Brooke hit her target in just five days. In the end, 782 backers pledged a total of £55,000 to the campaign. The Blaze Laserlight launched in February 2014; now it's being sold in 47 countries worldwide.

Brooke's story is by no means unique. To date, nearly 90,000 projects have been successfully funded through Kickstarter, with more than US $1.8 billion pledged on the platform since it launched in 2009. And Kickstarter is not the only player in the game; according to a recent Massolution survey of 1,250 active crowdfunding platforms around the world, US$16.2 billion was raised globally last year, up from US$6.1 billion in 2013.

In the past, entrepreneurs relied on individual investors and VCs if they wanted to raise early-stage funding. Now, thanks to the explosive popularity of the crowdfunding model, which is driven by the connective power of the Internet, more and more start-ups are raising funds from large numbers of people, most of whom they will never meet face-to-face. The most successful crowdfunded project to date, an online video game →

called Star Citizen, claims to have raised more than US$85 million in the past three years and is being funded by nearly one million people.

If you are one of the backers of Star Citizen – or other mega-successful crowdfunded projects – you are effectively buying the product in advance, with the added satisfaction of knowing you've helped bring it to market. (Star Citizen's backers will have to wait till 2016 before they get to play the game.) This is known as the pre-order model. You can also access perks, such as a signed poster or a deluxe edition of the product, depending on how much you pay, but you take no stake in the company.

On the other end of the spectrum is the equity model, whereby broad groups of people buy equity in start-ups through online platforms such as Seedrs. The motivation in this case is profit but, as with all investments, risks are involved and there is no return on investment when a company fails.

CROWD FUNDING

Despite regulations on equity crowdfunding in many countries, including the US where only accredited investors are eligible to partake, it's clear that crowdfunding as a whole is on the rise – the Massolution survey predicts that the global market will more than double in size again in 2015, rising to US$34.4 billion.

But to what extent is it disrupting the established finance industry? According to Nir Vulkan, associate professor of business economics at Saïd Business School, University of Oxford, crowdfunding is – for now, at least – filling a gap rather than competing directly with VCs and financial institutions. "In the last few years VCs have moved up in terms of level of investment and it's harder to get smaller amounts," says Vulkan, who is conducting new research into the economics of equity crowdfunding. "The alternative has been 'angels' or friends and family, but it's not easy to get more than a few thousand pounds, unless you have a rich family. A company like Seedrs is good at addressing that particular niche and you see a lot of projects now getting funding of £100,000 to £200,000.

"But it is gaining momentum," he adds, "and deals are clearly increasing, and so it is beginning to have a disruptive effect."

If you want to fully appreciate the effect crowdfunding is having, says Irish entrepreneur and investor Dylan Collins, you need to assess its impact on a sector-specific basis. "If you look at the toy market," says Collins, who is also the CEO of kids' digital media company SuperAwesome, "it's very hard if not impossible to raise an investment if you're a small business. But if you run a good Kickstarter campaign and you have people pre-ordering a toy, thus giving you working capital, that changes everything. So I think in certain areas crowdfunding is having a hugely positive impact."

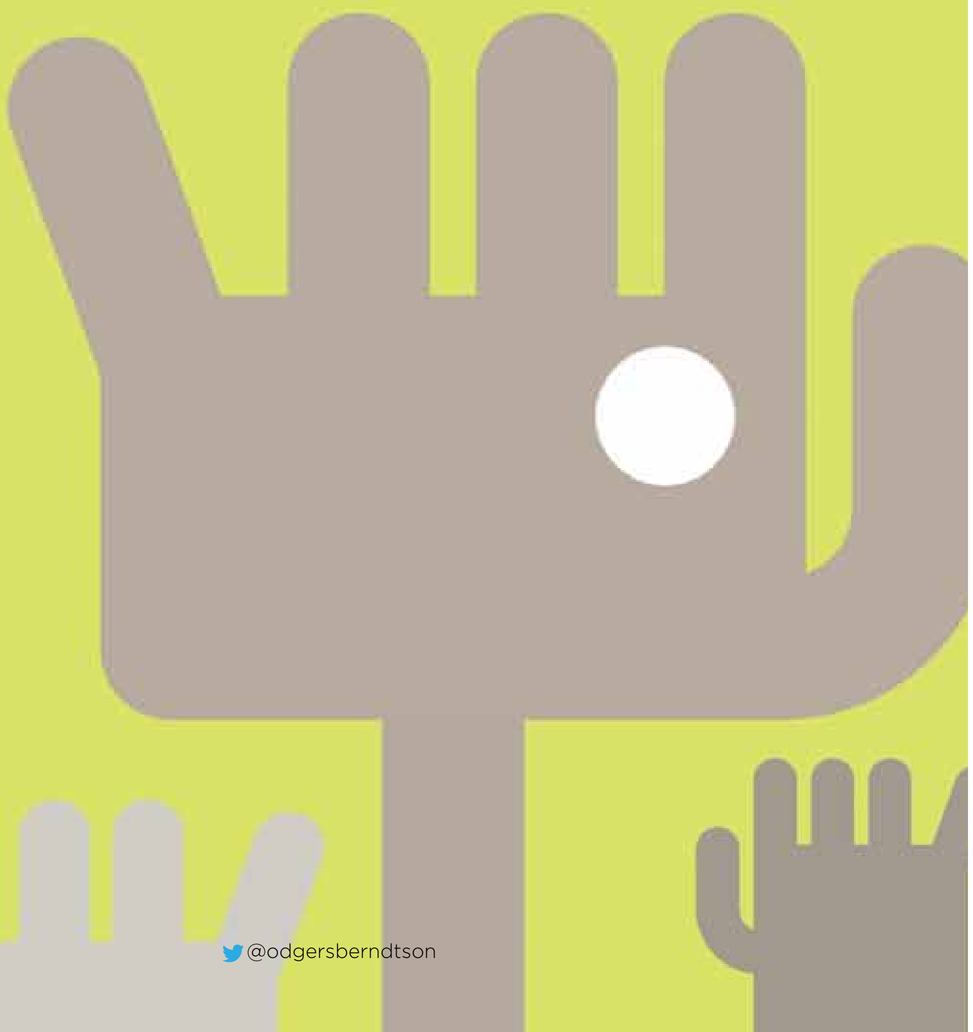
The benefits extend well beyond access to capital. When Emily Brooke ran her Kickstarter campaign back in 2012, her primary motivation was to show that demand existed for her bike light. "Kickstarter helped me prove that people would actually pay for my idea," she says. On top of that she received customer feedback. "The 782 people who backed our campaign told us what they liked and didn't like and the product changed an awful lot in that process – basically they're paying to do your market research, which is incredible." Brooke also counts as a major benefit the publicity that comes from running an eye-catching campaign.

Of course not all campaigns turn out as brilliantly as Brooke's. Yes, nearly 90,000 projects have been successfully funded on Kickstarter, but the number of unsuccessful projects is considerably higher – currently around 150,000. Still, crowdfunding flops don't seem to be deterring more and more people from investing money and launching their own campaigns. And it's not just early-stage funding rounds that are being thrown open to the crowd. "We would potentially look at a company like CrowdCube for our next round of financing," says Brooke, adding: "That's where I think the biggest change is coming from: equity crowdfunding. And I think that really will start unsettling early-stage investors."

Collins points to peer-to-peer lending services such as Funding Circle in the UK and Lending Club in the US, which allow savers to lend money directly to SMEs without involving banks or other traditional financial institutions, as a potentially major source of disruption. "I'm pretty certain this phenomenon will get much bigger as the banks don't particularly want to be in this sector," he says.

Collins also predicts that disciplines rendered uneconomical by digital media, such as investigative journalism, will increasingly benefit from crowdfunding. "TV economics doesn't support expensive investigations any more but it doesn't mean people are less interested, so I can envisage groups of people buying rights to a story and getting return on their investment if it's resold around the world. That would be really interesting.

"It's a fascinating sector to watch," he adds. "Whatever happens, I think crowdfunding will keep on growing for some time." ◘



VIEWPOINT: Disruptive innovation

Shane Owenby

ON WHY BEING 'UBERISED' SHOULD BE ON YOUR RADAR

I love disruption, whether it is geoeconomic disruption (like the financial crisis) or start-ups looking to disrupt established verticals.

Amazon Web Services (AWS) provides enterprises, start-ups and governments with access to computer capacity, storage and networking (or cloud computing) via a pay-as-you-go model that fuels innovation and industry disruption without the need to have large amounts of capital.

Just look at Spotify or Airbnb, who run on AWS and are completely disrupting the markets they operate in. I regularly warn large enterprises about being 'Uber-ised' or 'Airbnb-ised'. Those types of companies are completely disrupting big enterprises and making them seriously question whether they have the DNA and the muscle to remain competitive.

AWS is often approached by large established corporations asking us how they can bring best practices of innovation into their organisations. Many of these conversations revolve back to the amount of disruption they are facing from existing competitors, new start-ups or changing marketing conditions.

Old school companies that think they can carry on doing what you're doing for a long time are mistaken. Every industry and every enterprise is ripe for disruption.

I don't think, for example, the world's largest hotel chains thought they were going to be usurped by someone renting out rooms in people's private homes but it's happened. And it's exactly the same for Uber and taxi licenses, or the way that Whatsapp has transformed telecoms.

Companies need to start *expecting* disruption rather than wondering when or where it's going to happen.

Shane Owenby is Managing Director of Amazon Web Services, Asia Pacific

THE MIND GAME

Mindfulness is radically changing the leadership landscape

Imagine if, even for one second, you could press the pause button. For many leaders it may seem an absurd proposition – after all, we live in an incredibly complex and fast-paced world where 24/7 distractions, constant pressure and information overload have become accepted as 'part of the job'.

But what if you were told that taking a brief moment to slow down – focusing solely on the task in hand, the person you're talking to or the surroundings you're moving in – is now the key differentiator between a leader who is able to simply survive and a leader who will thrive?

MIND FUL NESS

The answer is mindfulness. It's likely you've heard the term – it is, after all, the latest buzzword in the executive vernacular. But this is far more than a fad. Inspired by the ancient Buddhist practice of paying attention with focus, clarity and discernment, mindfulness is revolutionising the way leaders approach their day-to-day activity.

Making business decisions on the basis of experience is outdated. Think you can multitask? Think again.

Faced with a relentless flood of information and distractions our brains are dealt the impossible task of processing everything simultaneously. It decreases efficiency, has a dramatic impact on effectiveness and drastically reduces productivity.

Today, the smart leader is slowing down in order to speed up. Mindfulness enables senior leaders to improve their focus, flexibility and adaptability in order to move beyond traditional ways of thinking.

As a result the world becomes open to new ways of understanding, leading, creating and innovating.

According to Rasmus Hougaard, author of *One Second Ahead: Enhance Your Performance at Work with Mindfulness*, and Founder and Managing Director of The Potential Project – the global leading provider of corporate mindfulness programmes: "The new normal in business is an ever changing, globally interconnected and competitive reality. Traditional factors of knowledge, speed and experience no longer meet the demands. In fact, today they can become the factors that keep you stagnated in the status quo with a leadership style of yesterday."

"Knowledge was foundation yesterday," he continues. "But today's leadership calls for minds that have high levels of clarity to embrace and penetrate the unparalleled complexity. Speed was the fuel of yesterday's leadership... Speed doesn't cut it any more. But a clear mind does. It helps you do the right things, instead of all the things that call on you.

"Experience was needed yesterday. But today it can put your business in the grave. For all the benefits of experience it also has a shadow: it can close your eyes and make you cognitively rigid. It can make you miss the overnight changes and make you fail because you see today with the glasses of yesterday."

For Hougaard, leaders are living in an 'attention economy' where mental fitness is the defining competitive advantage. "It's disrupting the whole paradigm that multitasking and running faster is a great thing. Level of focus now determines business and leadership performance, it is one of the foundation tools for leadership excellence," he says.

"Clarity of mind is fundamental. It can be the quality that puts you a second ahead of others, in both thoughts and actions, and I've no doubt that it can ultimately mean the difference between success and failure."

The proliferation of mindfulness throughout the corporate world is considerable. Google, Microsoft, Nike, Intel, American Express, General Electric, Sony and Transport for London, to name a few, provide mindfulness programmes for employees while Harvard Business School now includes mindfulness practices in its leadership programme.

Google's 'Search Inside Yourself' mindfulness course, which started as an in-house offering for employees has become a globally recognised programme used by the likes of LinkedIn, AXA, Schlumberger, Ford and BAE Systems. It combines meditation practices with advanced neuroscience and technology to achieve resilience, a positive mindset and centred leadership.

According to its website: "Effective leadership isn't about just checking off more tasks. It's defined by how well we use our minds and interact with others. We need flexibility and clear purpose in the face of complexity... yet our workplaces are churning out burned out leaders who report little bandwidth for big-picture thinking, for innovation, truly understanding others and building strong culture."

Hougaard, who through The Potential Project provides mindfulness programmes to Fortune 500 companies around the world, points to another example. "Steve Jobs was a regular meditator for more than 25 years of his life," he says.

"He attributed his ability to think completely outside the box, and even Apple's entire ethos of striving for total cutting edge innovation, to his practising mindfulness techniques."

There is no secret. By taking the time to focus, to correctly direct attention and to approach work with the clarity and focus that mindfulness provides, leaders are now bringing all their capabilities to leadership.

Quite simply, it's a must have. By stopping, taking a breath and focusing on the task ahead the smart leader will be able to buy themselves an extra second. And in today's fast-paced executive landscape that may well be all you need to distance yourself from the competition.

VIEWPOINT: Masters of our fate

Robert Madelin

DON'T FEAR DISRUPTION, THINK ABOUT THE OPPORTUNITIES IT PROVIDES

Disruption is abundant in the tech sector. Just look at the way that IT has changed our approach to the world. It's unleashed new and radical options that mean it is seldom not disruptive in any form. Any data-driven innovation or pure tech innovation is dissolving previously impermeable frontiers between sectors and activities in a way that many find uncomfortable.

In order to deal with disruption we're going to have to re-learn the value of infrastructure. People assume that in this new immaterial, digital world we no longer need infrastructure and if you look at the underinvestment into infrastructure over the last 10 or 20 years it's a tragedy.

Education and the availability of learning in order to keep up to date with the speed of disruption will be critical, and we'll finally have to wake up to the fact that we will have to invest in the fundamentals in order to be successful.

Secondly, We'll have to progressively understand that the untapped value of data and data-driven innovation is so big that current ideas about who owns that data and who has rights to access it will need to change radically. It's an ethical question that is in the interests of society.

Disruption is something that we cannot avoid. What we lack as human beings is the ability to say "I want to understand potential changes and to master them". In other words we, as a society, need to get back into a mindset of being masters of our fate.

I believe that a more participative approach in society will unleash our optimism about change.

Robert Madelin is Senior Innovation Adviser at the European Commission

UP STREAM

CHRIS SMITH on how Internet-based, on-demand entertainment content is widely disrupting traditional distribution models

Digital media streaming is a revolution enabled by the rapid advancement of communications technology. High-speed Internet at home, on the go and even in the skies is enabling consumers to enjoy their favourite media content on demand, wherever they roam and on any screen they choose.

But what does this mean for businesses? Traditional media providers in the television, music and gaming industries are facing unprecedented challenges from fresh-faced tech innovators and, while innovative new solutions are resonating with them, decades-old business models are also altering rapidly.

In TV land streaming services have offered viewers a tantalising glimpse at democratised, à la carte original content available to watch on their schedule.

Increasingly, in 2015, they're getting it directly from content creators like HBO, Showtime, WWE, Amazon and Netflix.

"Thanks to streaming solutions, we're witnessing a great unbundling of programming and the idea of traditional television is fading," says Brian Solis, the author and Principal Analyst at The Altimeter Group.

"The increasing number of devices carried and available internet bandwidth has led to a great disruption in consumer expectations."

BskyB in the UK is one of many companies adapting the business model to meet the demands of the streaming era. Consider this, new customers had traditionally been locked into pricey 12-month accords, requiring a home dish and set-top box installation. Such has been the change in landscape; Sky now offers day-by-day streaming deals through Now TV, on almost any device.

For Sky, a consistent innovator, the rapid development of streaming technology has presented an opportunity to reach a new customer base.

Now TV's director of strategy James Alexander tells *Observe*: "Now the technology is in place, the whole OTT [over the top streaming] sector is exploding in the UK.

"There are so many things happening to eliminate barriers for people who have long wanted access to pay TV content, but have taken themselves out of consideration.

"Now TV is a way to go after that part of the market, to take advantage of Sky's assets and to repackage them in a way, which plays to the consumer demand. It taps into a different type of customer and this is why we experience such little cannibalisation and why the two brands are still experiencing growth.

"The economics of over the top delivery means it makes sense to serve these customers day by day."

In the US, traditional content providers are also changing tack. Crown jewel networks HBO and Showtime have in mid-2015 gone directly to customers with standalone streaming services that do not require a cable TV subscription; a huge watershed moment and a hallmark of the unbundling Solis speaks of.

"Consumers are now in control of their own ecosystems. Rather than 100s of channels they never watch, the mantra of connected customers is now 'all you need is… less.'"

In the US, traditional content providers are also changing tack. Crown jewel networks HBO and Showtime have in mid-2015 gone directly to customers with standalone streaming services that do not require a cbale TV subscription; a huge watershed moment

These affordable monthly, no-commitment platforms seek to address three issues for the show-makers like HBO and Showtime: The rampant piracy of their content (the June finale of *Game of Thrones* was illegally downloaded 2.2 million times in 10 hours, while some used a new live streaming app called Periscope to beam a feed of the show to Twitter in real-time!) the dramatic rise of Netflix as an original content competitor, and the rise of the binge-viewing, cord cutter.

Vince McMahon's World Wrestling Entertainment (WWE) pioneered and rode the pay-per-view distribution model for 30 years. Now it is selling direct to customers via the WWE Network – the first ever 24/7 over-the-top TV network.

Instead of consumers paying $55 a month for monthly PPV events via a cable provider, Network subscribers get those same events, stacks of original programming and the vast library of archive content available for US$10/£10 a month.

WWE Chief Revenue & Marketing Officer Michelle Wilson explained the decision to tear up the tried and trusted business model.

She told us: "We spent three and a half years looking at →

STREAMING BY NUMBERS

- According to a recent *Wall Street Journal* report, Spotify has been valued at US$8.4 billion
- An estimated 41 million people paid for streaming music services in 2014, versus 28 million in 2013
- In the first half of 2015 Netflix's share of peak period downstream traffic from fixed internet connections grew to 36.48 percent. [Source: statistica.com]
- US online consumers spend 10 per cent of their entertainment time streaming movies or TV on subscription services [Source: Nielsen]

all options available and saw the consumer adoption of direct to consumer subscriptions grow dramatically.

"Combining that with the fact that WWE fans consume five times the amount of digital content than the average consumer and are two times more likely to order Netflix or Hulu, we realised going direct to consumer was a very viable option.

"It provides us with a tremendous global opportunity to have a one-on-one relationship with our fans and access to critical data that we didn't have in the past."

However, before conquering TV, Apple has work to do in other streaming sectors. It's already playing catch-up in the digital music arena it had previously dominated.

For years Apple watched streaming services like Spotify tear chunks out of its iTunes Music Store revenue. It's easy to see why. A monthly subscription offers access to 30 million tracks for the same price as a single album download.

STREAMING

However, on June 30 2015 Apple fought back. Apple Music matches Spotify's proposition and price point, while offering the advantage of built-in access to hundreds of millions of customers already carrying iPhones and iPads.

It's a big shift for Apple's business model, but a necessary and overdue one. Warner Music Group announced in May it had made more money from streaming than digital downloads for the first time. The tide has turned.

"The rate of this growth has made it abundantly clear to us that in years to come, streaming will be the way that most people enjoy music," Warner CEO Stephen Cooper said during the earnings call.

During this transitional period, the economics of streaming are the subject of great debate, but little clarity. Royalties for per stream over sales are inherently lower, but companies like Spotify, by far the most dominant player, are persisting with ad-funded options that give music away for free, as well as the £10 monthly Premium tier.

Apple and another streaming newcomer Tidal (fronted by hip-hop mogul Jay-Z) offer paid-only tiers. As a result, influential artists like Taylor Swift are siding with Apple and Tidal and withholding music from Spotify, who suddenly seem old guard.

"Tidal believes in valuing music," said Pål Bråtelund, the company's Strategic Partnership Manager. "That is a model that wants to deliver value to fans but compensate artists at the same time. To us it's important that the money comes back into music creation.

"This market is experiencing big movement and we'll continue to see that for the next five to 10 years as the world transitions to streaming. "We are a market with 40-50 million paying customers right now, but I think it will grow to a billion. In between there'll be a healthy business."

One industry that does not require re-growth is gaming. However, streaming is still having a huge impact; not so much in how games are played, but how they're watched.

Twitch.tv, a four-year-old start-up was recently sold to Amazon for a staggering US$1 billion. Here's why: Half of its user-base spends more than 20 hours a week watching other people play video games. It's a staggering level of engagement and has catapulted the company to the fourth most popular website (during peak traffic times) in the US.

Its 100 million unique viewers a month are turning into 1.5 million individual broadcasters and spending a long time watching. Some of the 11,000 partner channels get so many followers they're able to make a living from the shared subscription proceeds.

Matthew DiPietro the company's SVP of marketing tells *Observe*: "It was the ubiquity of broadband that made Twitch and its live high definition video content available on a global scale possible and revived the appeal of watching games.

"To understand the phenomenon in simple terms, people enjoy watching others who are the best at what they do when it involves a shared interest."

With that said, are streaming services like Twitch.tv, about to surpass the act of actually playing? Are gamers prepared to drop their controllers, sit back and watch the elite?

"Viewers eclipsing players is a tough thing to gauge," DiPietro muses, "but it's safe to say both playing and watching games are continually on the rise."

Speaking of on the rise, there are few sectors immune from the streaming revolution, including air travel. Both JetBlue and Virgin America are utilising new satellite broadband technology to bring an end to those in-flight 'this connection does not support streaming services' blues.

JetBlue has partnered with Amazon to offer Prime Instant Video access to the entire library via its free Fly-Fi broadband service on flights in the US using their own devices or the seatback console. That's a big deal.

The technology is there and the appetite for on-demand content in any setting on any device is higher – quite literally – than ever.

Apple and another streaming newcomer Tidal (fronted by hip-hop mogul Jay-Z) offer paid-only tiers. As a result, influential artists like Taylor Swift are siding with Apple and Tidal and witholding music from Spotify, who suddenly seem old guard

Chris Smith is a technology writer based in New York

VIEWPOINT: Mobile in Asia

Jacob Kvist

ON MOBILE DISRUPTION IN SOUTHEAST ASIA

In our region disruption centres on the rise of mobile. Vietnam is still quite a traditional media market, as is Southeast Asia in general, but consumers have advanced.

They're no longer spending their time around TV but on mobile technology, and no one has really cracked how we can use that as a significant marketing platform.

The old model of simply buying advertising space simply doesn't work on mobile. So, our clients are investing in advertising and spending money on media that is becoming less effective, which is a huge disruption to the ecosystem but also a great opportunity.

There are two ways to crack that disruption. The 'defensive' approach involves optimising whatever is being done on traditional media. We're adopting the more offensive play: investing heavily in mobile advertising and employing a lot of people focused purely on that platform.

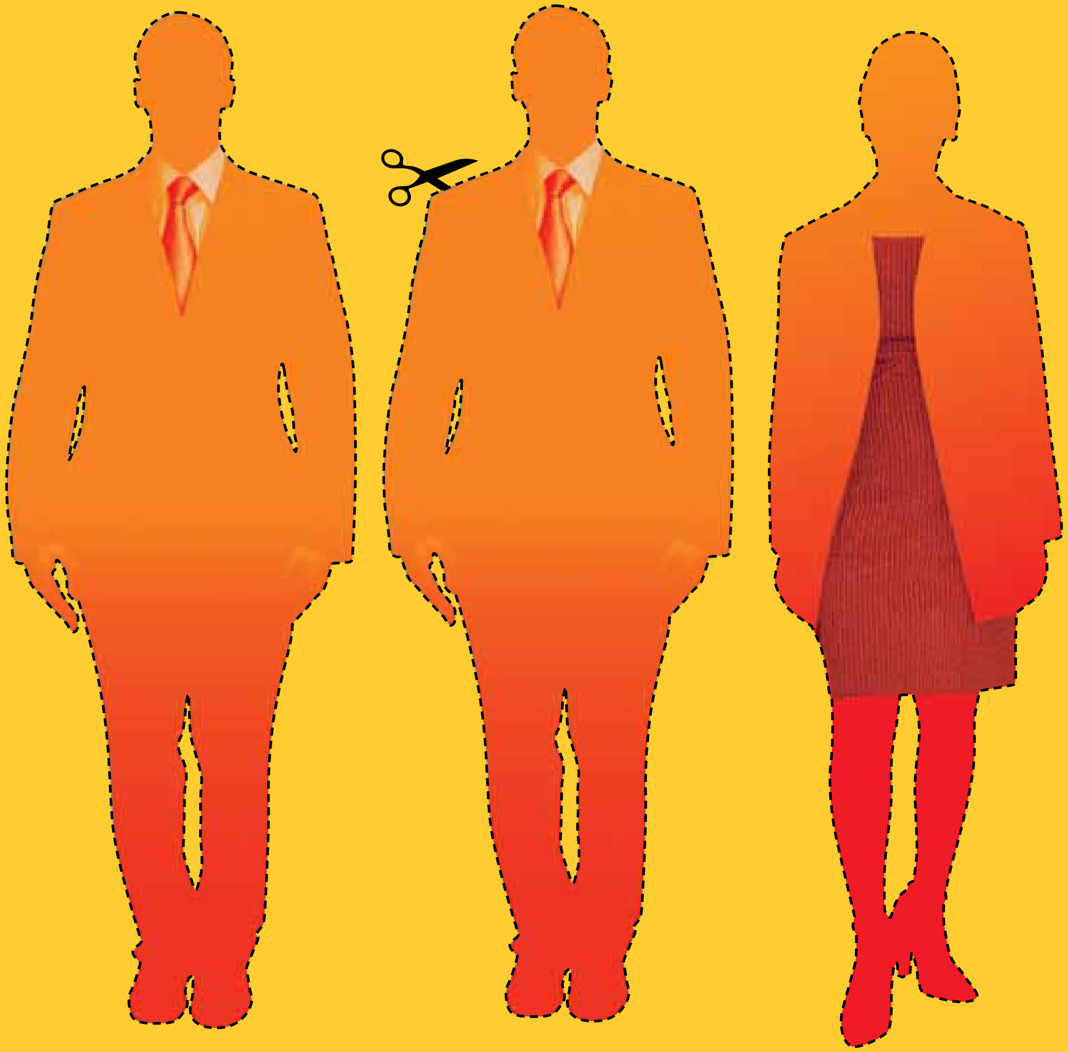
Have we truly cracked how to engage consumers in a cost-effective, mass reach way on mobile yet? The answer is no. Nobody in our industry has.

When it comes to communication consumers are now in control. Our investments have shifted towards conversations than messaging.

The disruption has had such an impact that the entire industry is struggling to adapt due to this massive shift in power from publishers/brands to consumers.

The lines between who does what in the industry will become more blurred in the future. You won't necessarily have an advertising agency that comes up with an idea, then a media agency and a digital agency that execute it because it just doesn't work with where the consumers are at. The lines need to be redrawn.

Jacob Kvist is CEO of Group M in Vietnam



The unstoppable rise of collaboration

RACHEL BOTSMAN is a global expert on the power of collaboration and sharing – which excludes the middleman – to transform how we live, work and consume. She talks to *Observe* about this brave new world

Rachel Botsman is one of the world's leading commentators on the rise of the so-called collaborative or share economy: the radical system where consumers share goods, services, space and money empowered by social networks, mobile devices, online marketplaces and other new technologies.

Botsman describes the collaborative economy as an "economic system of decentralised networks and marketplaces that unlocks the value of underused assets by matching needs and haves in ways that bypass middlemen."

This crucial elimination of the middleman and thus bypassing of the traditional modes of production, distribution and consumption, have thrust the collaborative and share economy to the forefront of current economic thinking.

Botsman is a World Economic Forum Young Global Leader, was named by Fast Company as one of the 'Most Creative People in Business' and Monocle cited her as one of the top 20 speakers in the world to have at your conference.

Her writings and research have featured in the *Harvard Business Review*, *Wall Street Journal*, the *Economist*, and numerous other publications. She has spoken to and advised a diverse range of companies including the Clinton Global Initiative, Google, Microsoft, PwC and many others on the power of the collaborative economy as a "lens to view challenges and unlock new opportunities in the world".

As we will see the likes of Uber, Airbnb, TaskRabbit (a mobile marketplace for people to hire other people to do jobs and tasks), Etsy, Kickstarter, Vandebron (a Dutch start-up which arranges for consumers to buy electricity directly from independent producers cutting utilities out of the transaction entirely), Cohealo (pioneering collaborative consumption in healthcare), Fon (which enables people to share some of their home Wi-Fi network in exchange for getting free Wi-Fi from anyone of the seven million people in Fon's network), and numerous others both large and small have disrupted economic models in ways that are only now being understood.

> "Renting, lending, swapping, sharing, bartering, gifting through technology"

Looking really clunky

As Botsman says: "Renting, lending, swapping, sharing, bartering, gifting through technology," is taking place in ways and on a scale simply not possible before the Internet.

In the five years since Botsman and her co-author Roo Rogers wrote their ground-breaking book *Collaborative Consumption* things have moved on remarkably fast. "When we wrote the book we had the likes of eBay and Craig's list," says Botsman, "which now look really clunky compared with what we see today."

When *Observe* caught up with Botsman she was passing through London en route to another round of lectures and talks as well as embarking on teaching the first-ever MBA course on the collaborative economy at Oxford University's Saïd School of Business.

It's a timely moment for Oxford to offer such a course. According to Forbes, "The revenue flowing through the share economy directly into people's wallets will surpass US$3.5 billion this year [2014], with growth exceeding 25 per cent. At that rate, peer-to-peer sharing is moving from an income boost in a stagnant wage market into a disruptive economic force."

COLLA
BORATION

"At a macro level," says Botsman, "what is causing change in a way that we are just starting to understand is a big shift from top-down, centralised organisations that →

ILLUSTRATION: ©IKON IMAGES

control the creation and distribution of goods towards distributed marketplaces and networks where the creation, the access and the distribution of goods look very different."

What this means in a disruptive age, says Botsman, is that there is a "fundamental change in customer behaviour that can't be reversed". Botsman continues: "Take Airbnb. People originally saw it as a way for people to share homes but what is fascinating is how technology created not only efficiency but also the trust that meant they didn't have to build a portfolio of hotels or accommodation but could facilitate access to inventory that already existed and, through that, they could scale very rapidly. But they could also give people an entirely new experience – and in a very short window of time they are changing customer behaviour around travel."

Rethinking from A to B

Botsman adopts the same principle for Uber, the collaborative business that allows users to hire a taxi, private car or rideshare directly from a mobile phone, in minutes, using its app. "It [Uber] is really frightening to people because it's gone into a sector that really hasn't changed for 50 years – taxis and transportation. People were suddenly saying 'Oh my God, this will completely rethink the way we get from A to B'."

Botsman believes these new players aren't just rethinking transportation or hospitality "but rethinking supply and demand and rethinking where customers get products and services from and who they trust in ways that can transform not just taxis or hospitality but a bigger behaviour."

However, this brave new collaborative world does have its complications. At the time of writing Uber's foray into France hadn't exactly gone according to plan. Uber closed its ride-sharing service, UberPop, in Paris, after the arrest of two executives and a series of increasingly disruptive protests against the company in France.

The Guardian newspaper reported that the company had made the decision as a result of "intimidation, violent protests and organised aggression against UberPop drivers and users … due to a minority of out-of-control individuals. Uber does not wish to run the slightest risk to UberPop drivers and passengers," it added.

Despite this unexpected and violent reaction to ride sharing collaboration, 10,000 drivers have signed up for the service in France. Uber said: "We understand that new technology is disruptive: not just for established companies, but for the people who work in them and their families."

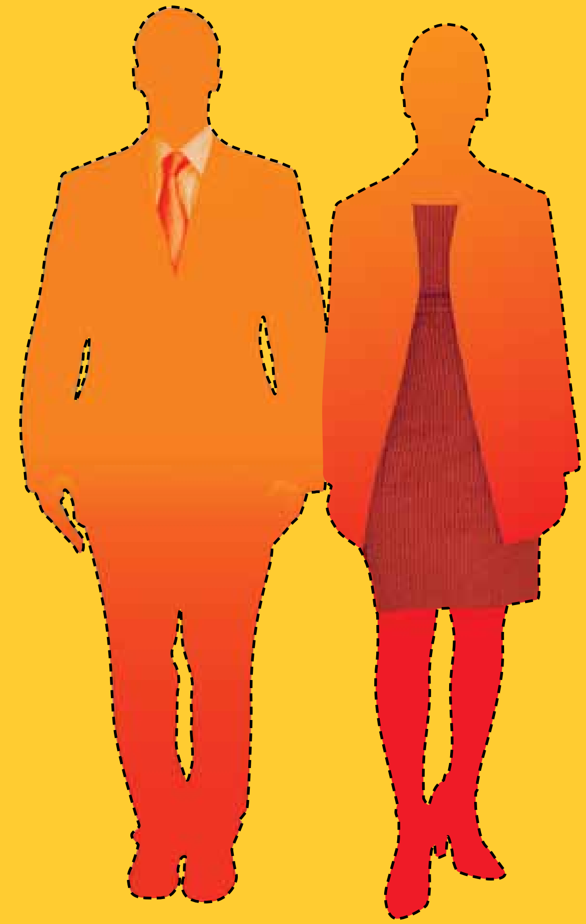
"If you take this principle of access over ownership," says Botsman, "and shared access to resources [see Vandebron] it can have massive applications in emerging markets where it can be anything from there isn't a banking or transportation infrastructure, because you can bypass many of the traditional models. M-Pesa is a really good example. You can directly lend money through a mobile phone and bypass the bank all the way through."

Democratising access

In a recent investigation into mobile finance, the *Economist* said: "In Africa, only one in four people has a bank account but eight in 10 have access to a mobile. An early fintech success was M-Pesa, a Kenyan phone-based payments scheme launched in 2007 by Safaricom, a telecoms group. By knitting together a network of agents selling airtime into something akin to a banking grid, the scheme opened up cheap and instant payments to the masses. It is now used by three-quarters of Kenya's 22 million adults."

What about the people who run these new organisations? Such innovative businesses have human capital needs that are outside of the norm. Says Botsman: "The people actually running and building these companies have a very different DNA. Many of those I have spent time with recognise the relationship the customer (if you can call them that) and the company wants is fundamentally different. For Airbnb there is no distinction between community and

> "It's about continually creating new challenges and opening new doors"



company: the hosts, the guests, the employees are all seen as one big organisation. You may be an employee one day, a host or guest another.

"The traditional way of thinking is that there's a firm line between employees and the people you provide goods and services for, so they have to structure these companies completely differently. Customer experience, trust and safety, they're the largest divisions in these businesses."

Botsman knows that "these guys" (at Airbnb, Uber et al) "are incredibly commercially savvy but they think completely differently about organisational culture and structure. Traditional roles are being redefined or completely fractured because they have multiple dimensions."

Future of work and jobs

According to Botsman, over the next couple of years the "future of work, the future of jobs, the rise of an independent, more distributed labour force is going to become a massive topic of conversation. What I am starting to see, and I really encourage this in organisations, is the behavioural changes: how does this change the way I think about something that in turn leads to a bigger system change."

Ultimately for Botsman it's about "having the leaders in place that can re-imagine the way value is going to be created and then consumed."

rachelbotsman.com
What's Mine Is Yours: The Rise of Collaborative Consumption (2010) by Rachel Botsman and Roo Rogers is available now

VIEWPOINT: Disruption in MENA

John Vickerman

ON DISRUPTION IN THE MIDDLE EAST AND NORTH AFRICA (MENA)

In the MENA region, disruption comes in many forms.

Technology is a significant disruptive force that has enabled us to compete digitally alongside the traditional cable and satellite delivery methods. Growth in digital means that we can now deliver great content to customers on the move or at home, and on various connected devices.

Customers now watch TV while simultaneously interacting with social media on their iphone, tablet and other devices, which allows us to gain instant feedback and have more accurate information on the content they are watching and want to watch.

A very young population is fuelling this disruption. In Saudi Arabia, for example, 46.9 per cent of the population is under 24, highly educated and affluent, so the adoption of new technologies is swift and consumers demand high quality content instantly.

Recent figures from Dubai School of Government reveal that the MENA region has approximately 125 million Internet users, of which 53 million use social media every day. A separate study records that 80 per cent of Internet users in the region spend more than one hour every day on social media.

It adds up to tremendous interconnectivity and the rapid uptake of new ideas and technologies across traditional country boundaries, which are then adapted and defined for those cultures and markets.

It's easy to see new markets as risky or volatile, but engage with them and understand them, don't just fly in/fly out or wait for them to stabilise – by the time they are stable in a western sense, the opportunity may be lost.

John Vickerman is Senior Vice President HR at OSN, the largest pay per view TV network in MENA

FROM BROADCAST-OBEDIENCE TO MERITOCRATIC-EXCHANGE

NADIM SADEK on why the world of marketing needs radical change

If you want to beat your competitive set, you need to know where what you do works best, relative to all the others. And what to do about it in a way that gives you competitive advantage. Marketing needs better understanding of people.

It requires the will to say that the vast banks of data sitting in the vaults of the major research houses are obsolete. Sure, that's a big step. Invested infrastructures need to be declared redundant. But the time has come for normative data to be reset. It's time for a positive disruption.

Using much more consumer-aligned, culture-attuned measures is completely tenable, today. Why would one persist in using a map, when we can use SatNav with dynamic traffic predictions?

In marketing terms, the old world worked on the theory of conversion funnels. Tell them the story, tell it good, tell it again and again, and it'll stick. Acquire. Transact. Retain. 'We've got 'em now!' It relied upon broadcast-obedience. Today, it's different. We have an Inclination to Interact, or not. Interactions happen at different points on the relationship journey. Our affections wax and wane, depending on the last interaction or shared anecdote. The tide endlessly moves. What was a predictable, linear conversion model has become a dynamic pinball of surges and withdrawals.

In the world of market research, where the chief purpose is to make marketing more effective, conversion has underpinned every model, for every decade of the industry's existence. It's no longer fit for purpose. It does not reflect real life. What is the point of evaluating 'awareness' or 'advertising efficacy' when you

don't know if the consumer feels an empathetic connection with the brand, perceives integrity in its purpose, or finds it possible to relate to the manner in which the brand conducts itself?

The future of the market research industry depends upon saying goodbye to the idea of conversion, and welcoming the meritocracy-based idea of 'eXchange'. We need subtle, complex insights into human feelings – how we are being seduced one way, persuaded another.

Then there's the challenge of data itself. Most insight is still gathered the old way: via 'system 2', post-rationalised questionnaires. That might have been ok, until Nobel Prize-winning Professor Daniel Kahneman made it clear through his neuro-scientific enquiries, that much of our decision-making in life is reflexive, rather than reflective. "At the heart of his... work is the idea that when we think, we use two systems. There is our "fast" system 1: automatic, effortless, intuitive, and capable of providing instant answers to simple questions like '2 + 2 =' or 'Do you love your mother?' Then there is our 'slow' system 2, the back-up processor, which comes into operation when we need to stop and think about questions like 'What's 24 x 17?' or 'What's the endgame in Crimea?' (Thanks to Richard Godwin of the London *Evening Standard* for this summary.)

Despite complex language and higher-order cognitive function being part-definers of the sophistication of homo sapiens, our basic instincts still govern most of what we do. Instinctively we 'know'. Really want a car? Spend ages poring over every report to justify it. Don't like that woman you just met in an interview? Pore over her data to justify her exclusion from the candidate list.

Insights need to be measured by system 1-type, reflexive data-gathering. System 1 thinking is heart-felt, it makes us feel at ease with what we do, and how we behave. System 2 rationalises what we feel. Yet, with market research data, it's been system 2 all the way, for decades. The industry has relied on self-analysis and linguistic reporting of careful thoughts in both qualitative and quantitative research.

Marketing has so long been the renegade function for CEOs to manage. Using better measures and better data (Seduction and Persuasion, via System 1) we are also able, finally, to separate the value of a brand's propositional pull from its activation push. This makes it perfectly possible to identify how powerful the 'DNA' of a brand is, in terms of its correlation with value growth in its category, and therefore to make forensically guided investments in marketing activity to exploit that 'brand value'.

And, while one is changing to eXchange, why not re-think the whole business model of the research industry? The advisory model is all-pervasive. A bit of data is served up by battalions of people, sometimes brilliantly, sometimes lugubriously. Businesses like Uber have shown us we can revolutionise things, into a 'software as a service' model. The insight industry should invest in giving value through its IP: analysing powerful properties and opportunities in brands, and how clients can leverage those in a self-aware, empowered fashion, rather than perpetuating a cadre of craftspeople, variable in quality and subject to a host of system 2 flaws themselves, often prone to commentating rather than improving the odds of success.

So what is the future? eXchange, not conversion. system 1, not just system 2. Seduction and persuasion to unlock understanding of people's inclination to interact. Pull to understand brand potential, Push to know how well it's being activated. Commercially relevant correlated measures. A SaaS (software as a service) to drive down costs, and better serve brand-owners' needs.

Does this work all around the world? Yes! Take a macro view: we used to believe them, they who stood on pedestals. The 'pillars of society'. They were the wise, we were the willing. World leaders, banks, religions. Even FIFA! It was globally true that we liked authoritative figures in broadcast mode, telling us what to do. Then things changed. We discovered that talking to each other was generally as helpful as listening receiving 'voices from on high'. Instead of waiting for our next lesson, we explored, taught ourselves, came to our own understanding.

Peer power reigns everywhere. Transparency through technology lets us know every facet of those with whom we deal. Using tin from illegal Indonesian tin mines? Not paying your corporate taxes? Or, for every pair of shoes sold, donating a pair to children in need. Everything a brand does is today weighed and measured as part of that 'inclination to interact'. Broadcast-obedience has become meritocratic-eXchange. Worldwide, now, we see value through values.

If you've been feeling, as you read this, that it rings true... Stop thinking. Act! ▪

Nadim Sadek is CEO of TransgressiveX, an insights agency that delivers brand planning, through system 1 measurements of brand-consumer eXchanges

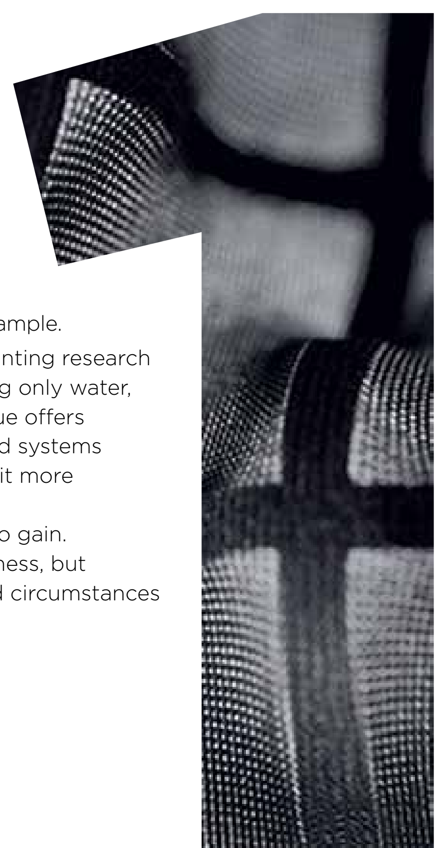
7 DISRUPTIVE TECHNOLOGIES

The age of disruption has led to the creation of some quite breathtaking technological advances ranging from 4D printing and carbon nanotubes to automation and robotics.
Report by MIKE WATERS

TECHNOLOGY

1 4D PRINTING

No assembly required



You've heard of 3D printing? Good, but you're already behind the times. 4D printing is what happens next, and it can be best defined as 3D printing plus stimuli. A 3D printed unit may still need some assembly before it is finished, but 4D printed materials modify themselves on the fly – clothing that becomes a looser fit when it gets warmer, for example.

MIT's Self-Assembly Lab is a major player in 4D printing research and they are clear on its promise, arguing that: "Using only water, heat, light or other simple energy input, this technique offers adaptability and dynamic response for structures and systems of all sizes." As research scientist Skylar Tibbits puts it more poetically: "This allows us to give materials a life."

The business environment, unsurprisingly, stands to gain. Inventory is a constant concern for the modern business, but equipment that can change itself to suit the task and circumstances can streamline almost any process.

MIT Self-Assembly Lab: selfassemblylab.net
Stratasys: stratasys.com

2 CARBON NANOTUBES

Golden Hammer 2.0

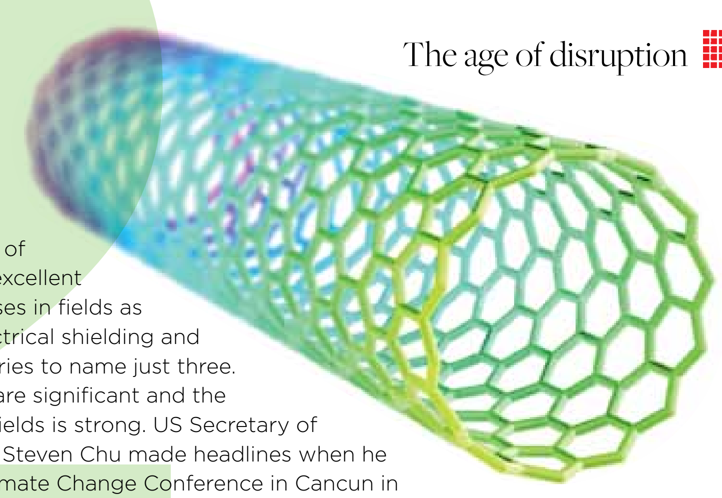


PHOTO: ©ALAMY

A synthetic material, carbon nanotubes offer the combination of great strength, light weight and excellent electrical conduction and have uses in fields as diverse as hydrogen storage, electrical shielding and next generation lithium-ion batteries to name just three.

The ramifications for business are significant and the potential for disruption in many fields is strong. US Secretary of Energy (and Nobel Prize winner) Steven Chu made headlines when he addressed the United Nations Climate Change Conference in Cancun in 2010 and noted that an electric car with a next generation lithium-ion battery which could be recharged in two minutes could be a realistic replacement for one powered by fossil fuels. Such an advance could turn electric cars from impractical curiosities to the next big thing, and the disruption this would cause would be major indeed.

From an investment perspective, the carbon nanotubes industry is also an interesting opportunity. One study by Grand View Research projected that global production will quadruple between 2014 and 2022 to US$3.42 billion, with 40 per cent of that growth in the Asia-Pacific region alone thanks to demand from the region's electronics sector.

Nanocomp Technologies: nanocomptech.com/what-are-carbon-nanotubes
New Materials News: newmaterialsnews.com

TECHNOLOGY

3 AUTONOMOUS VEHICLES

Reinventing the wheel

You've probably seen headlines about self-driving cars and perhaps they were even in Dave Coplin's exploration of them in this very issue. Estimates on precisely when self-driving vehicles will hit the market vary widely and it is rare to find two observers in agreement: Audi's Head of Product and Technology Communications Stefan Moser has argued for 2017, Tesla CEO Elon Musk has speculated on 2018, Ford CEO Mark Fields and Nissan CEO Carlos Ghosn both think 2020 more likely and Daimler Chairman Dieter Zetsche has predicted 2025. That all of the above are global names is no accident: this is the future of transport, and whoever holds the right patents wins.

The logistics sector is one of the world's biggest employers and the domino effect caused by disruption to this sector – can the US economy survive 3.5 million truckers abruptly becoming unemployed? – is simply too huge to be anticipated and, when magnified to the global scale, the instability will be immense. Are you ready? →

RAND Corporation (Autonomous Vehicle Technology: A Guide for Policymakers): rand.org/pubs
Institute of Electrical and Electronics Engineers: spectrum.ieee.org/static/the-self-driving-car

PHOTO: ©ALAMY

HYDROGEN FUEL CELLS

Engine for change

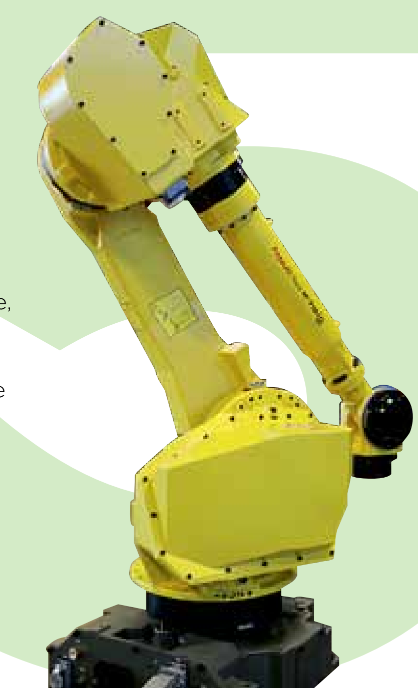
The hydrogen fuel cell promises to be the biggest disruptive development to transportation since the internal combustion engine replaced the horse, and the transition to a hydrogen-based economy will force a once-in-a-century disruption to the energy market and knock-on effects for anyone connected to it. In practice, that's every business to varying degrees and the disruption could be gigantic. For one thing, how exactly is a huge change in transport infrastructure away from a petroleum-based economy to a hydrogen-based economy to be achieved? Perhaps the most cutting summary came from Tesla CEO (and, incidentally, the Chairman of solar energy company SolarCity) Elon Musk: "Hydrogen fuel cells are the energy of the future – and always will be."

Altenergy.org: www.altenergy.org/renewables/hydrogen_power.html
Forbes – 'The rise of the Hydrogen Fuel Cell': www.forbes.com/sites/billtucker/2015/04/29/the-rise-of-the-hydrogen-fuel-cell/

TECHNOLOGY

ROBOTICS

Spanner in the works



Advances in robotics and artificial intelligence have seen steady improvements to the point where a disruptive expansion of robots' involvement in various industries is getting closer by the day. Professor Ayanna Howard of Georgia Tech explains: "Everything's starting to line up... The actuations, electronics and motors that you need to make robots function in the real world are getting cheaper. Everything's kind of coming together."

Manufacturing, construction and transportation are the sectors where robotics will likely replace human workers first – physical tasks that are difficult, dirty or dangerous or where boredom or distraction is a serious issue. Kawasaki, Yaskawa and Lincoln Electric, for example, all offer robots that can weld and thus replace a human worker who could become tired, make mistakes or just be inconsistent.

However, the other side of the coin is huge unemployment as entire sectors of the economy become permanently post-human. Is society ready for such upheaval?

Fast Company – 'Autodesk's Robotics Lab of the Future': fastcompany.com/3047927/exclusive-inside-autodesks-robotics-lab-of-the-future
Robotic Industries Association: robotics.org

The age of disruption


PHOTO: ©ALAMY

SOLAR POWER

Come for the sunshine, stay for the people

Has solar power's moment in the sun come at last? With the cost of solar power falling to the point where it can now begin to seriously compete with established coal, oil or nuclear options and projected costs of a mere US$1.60 per watt by 2020 according to research by McKinsey (as opposed to coal's current rate of approximately US$2.10 per watt according to the US Department of Energy), the next big shift in energy could be solar power taking a truly competitive or even dominant place in the market.

What does this mean for business? On the one hand, a solar panel or two on the office roof taking the sting out of energy bills will doubtless be welcome news to any CFO and keeping carbon footprint under control is a routine part of many a modern business strategy. On the other hand, disruption in the energy market famously spreads to other areas and a shift in infrastructure away from traditional models won't happen overnight, cheaply or easily.

McKinsey Quarterly: mckinsey.com/insights
Clean Technica: cleantechnica.com

NET-ZERO ENERGY BUILDINGS

One hand gives, the other takes

Net-zero energy buildings offer a disruptive new take on architecture that could see huge savings in facilities costs. Simply put, energy used in a building's operation is matched by energy generated through renewable means onsite, cutting the need for external power and making energy bills a thing of the past.

Interestingly, net-zero energy buildings are already experiencing a very promising growth in market share and industrial construction – a sector ever-conscious of the bottom line – is particularly fertile ground for net-zero energy approaches when conventional power options are cost-prohibitive or unreliable. Tesla, for example, won headlines the world over when their net-zero energy Gigafactory in the solar-power-friendly Nevada Desert was announced in September 2014. As net-zero energy becomes more practical and economical with each technological advance, net-zero energy assets may become a routine sight in real estate portfolios for tomorrow's businesses.

Forbes – 'Net-Zero Energy Buildings Are Coming': forbes.com/sites/justingerdes
Institute for Building Efficiency – 'Perspectives on the state of the market': institutebe.com/Green-Net-Zero-Buildings

TECHNOLOGY

Nicola Mendelsohn, Vice-President EMEA for Facebook, tells us why she took on her role and what challenges she faces

WHY I TOOK THE JOB

So why did you take the job?
Facebook connects 1.5 billion people from all over the world in one amazing global conversation. To be part of something that has become an intrinsic part of our lives in a relatively short space of time is very special. But what always really excited me about Facebook was how it is relentlessly innovating to keep up with the incredible pace of change around us. People are at the heart of everything we do and as they continue to evolve, so will we.

You have been in post for two years now, what was the first major issue or problem you encountered and how did you deal with it?
I wouldn't say there have been major issues, rather new challenges to face and overcome. What these two years at Facebook have shown me is that trying, failing and learning is a process you need to go through. It makes you better, more motivated and more willing to shake things up.

How has your own role evolved since you arrived?
My role is constantly evolving. Whether it's creating new advertising products for small business owners or expanding our physical footprint – we recently launched Facebook's new office in South Africa – Facebook is not a place to stand still. When I first joined the company, Facebook had only just acquired Instagram, we hadn't yet bought WhatsApp or Oculus and the separate Messenger app didn't exist. In just two short years we have created a family of apps and services that work both together and independently to connect more people all over the world. That pace of change is incredible and, with Facebook still only one per cent done with achieving its mission, I can't wait to see what the future years will bring.

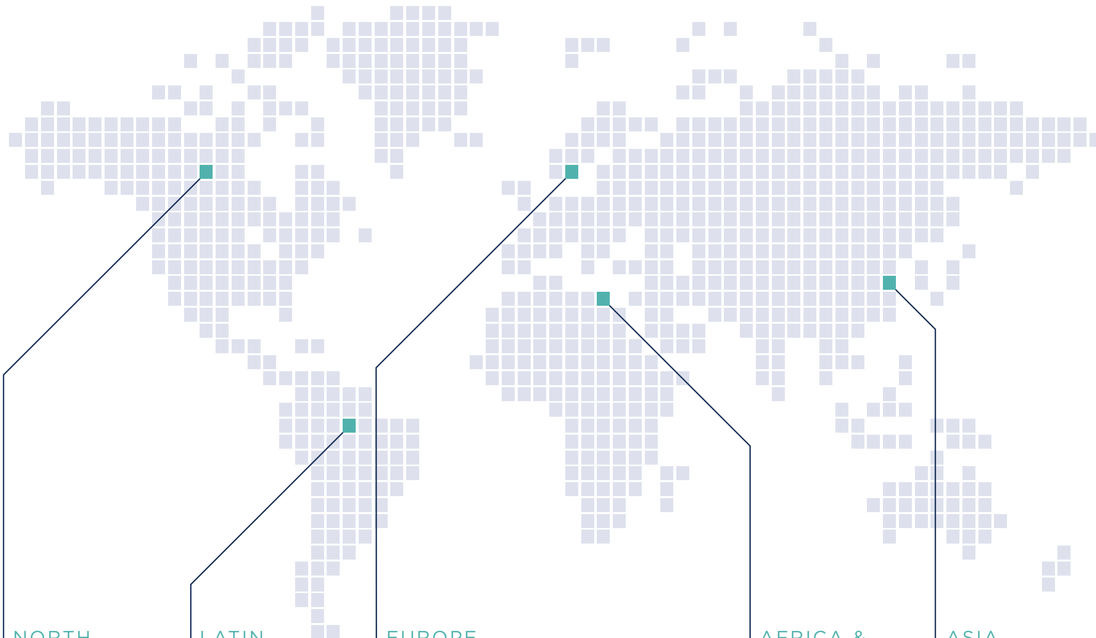
You are charged with growing Facebook's advertising revenue. How in a disruptive and rapidly evolving marketplace are you tackling that challenge?
Mobile has fundamentally changed the way we live our lives. It gives us freedom to do the things we as humans have always done – connect, share, discover – but in new and exciting ways. Today people have an infinite supply of content and total control of where to spend their time and attention. This has profound implications for businesses and advertisers, who have to really push the boundaries of creative content to capture the interest of their audiences, and at scale. We believe that the content shared by advertisers should be every bit as engaging as that shared by your friends and family. And today that means video. We are continually optimising the platform to provide a creative canvas that enables brands to deliver much richer storytelling through video, combining sight, sound and motion, which – in turn – provides a bigger opportunity for brand building, emotional resonance and loyalty.

What type of 'talent' do you look for to join your ranks at Facebook?
Facebook is an open, progressive culture that champions talent. We encourage people to be inquisitive and restless, and aim to create an environment that empowers and inspires our colleagues to be the best they can be. Sometimes that might mean trying and failing, but failure isn't frowned upon at Facebook – learning is a far better outcome. Mark [Zuckerberg] believes strongly in surrounding himself with passionate, exciting and inspirational people, hiring those people who he himself would want to work for – which I personally think is a brilliant mantra.

How would you describe your management style?
When I was at school, teachers told my parents that my questioning and inquisitive nature would be a barrier to having a successful career. In response, my father explained that this was precisely what would take me far in life. That voice in my head has always pushed me to ask questions and think creatively; this is the attitude I try to encourage at Facebook. Disrupt, speak out and don't be scared to disagree with people. As long as you do it in the right way, discussion can only make us think harder and deliver better and more original results.

I'm also a big believer in collaboration. I'm not really an advocate for hierarchy; rather I think we do the best work when we come together, learning from each other and challenging ideas. Now that I'm at Facebook, I'm lucky to work with some of the most impressive and inspirational people around, and I take every opportunity to learn as much as I can from them, as well as trying to share from my experiences.

Offices worldwide



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Archant Dialogue, Prospect House, Rouen Road, Norwich NR1 1RE, UK
www.archantdialogue.co.uk

Editor Jonathan Arnold
jonathan.arnold@archantdialogue.co.uk
Deputy Editor Matthew High
Art Editor Deb Murray
Designer Craig Pearce
Digital Design Manager Richard Berry
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