

# The fifty ideas that shaped business today



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# Foreword

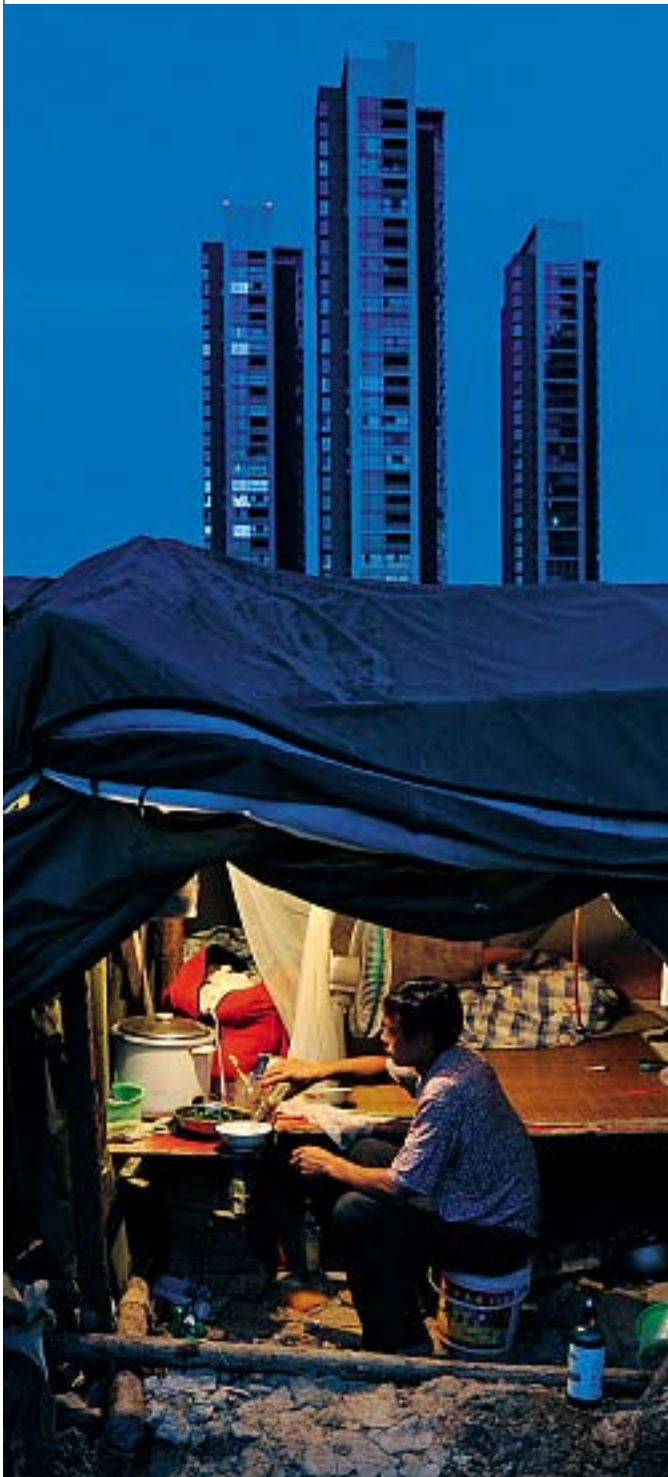


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What makes a great business idea? How can we tell whether it will stand the test of time? And why do some new ideas have greater influence than others in shaping the environment that businesses operate in today?

These are the questions that a distinguished panel of judges have evaluated in drawing up a list of the 50 ideas that most shaped business today.

Innovation – new ideas, reforms and other forms of change – are, of course, vital in stimulating progress. The task of the panel was to weigh the merits of ideas whose impact informs us about the past, the present and the future.

The selection was based on suggestions from our readers, from the six judges (see page 58) and from FT writers around the world.

Some of the 50 top ideas that our judges agreed on would have made anyone's list and are easily predictable. The effects of globalisation and China's adoption of market reforms, for example, will reverberate through time.

The 50 ideas are too varied to present in the form of a hierarchical ranking – that would be the equivalent of comparing apples with pears. The list includes concepts as dissimilar as workplace diversity, barcodes and tax optimisation.

To make it easier for readers to navigate their way through our list, we have grouped the 50 ideas into separate themes, with an overview to each section by a senior FT writer.

Our panel of judges also took the step of identifying a handful of the most likely candidates for key ideas likely to shape tomorrow's business world. You can find these towards the end of this magazine.

We do not expect that everyone will agree with all of our judges' 50 top ideas, let alone the ones for the future. But if nothing else the list will, we hope, inform the crucial, continuing debate about how the world of business can become more effective, efficient and relevant.

We hope you enjoy the list – and do let us know if you feel there is anything significant we have omitted.

**Lionel Barber**  
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# Introduction

What is an idea? And what do we mean by today? Those were the two questions that faced the six judges who chose the top 50 ideas that shaped business today, after combing through many suggestions from readers and Financial Times journalists.

The judges quickly decided on a generous interpretation of the word “idea”. We would go for inventions, innovations, social movements and legal and financial instruments – anything that helped make business what it is.

“Today” was more complex. Clearly, there were many inventions that have shaped not just modern business but modern life: electricity, telephones, multi-storey buildings. How far back should we go in deciding what counted as an idea that shaped business today?

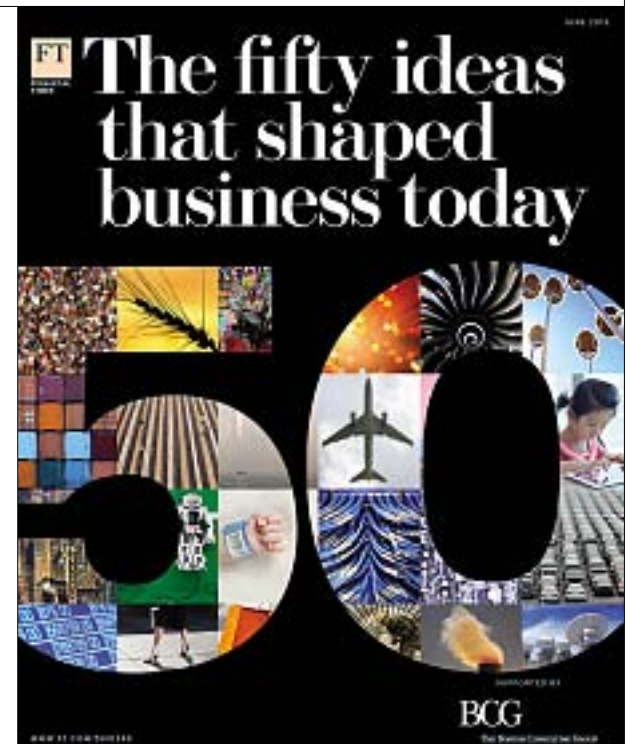
As the chair of the judges, I initially suggested that we not restrict ourselves. We should go back as far as we wished. Ideas such as Adam Smith’s division of labour clearly still influenced business today. So did the legal concept of limited liability; business would be unthinkable without it. But the other judges felt we needed to concentrate on the modern world. Otherwise, why not include the invention of the wheel?

So most of our 50 ideas ended up coming from the era since the second world war.

Another area of dispute was the influence of women. The arrival of large numbers of women in the workforce is unarguably one of the principal business developments of the past 50 years. What was the idea that had made that possible? Was it the birth control pill, or the example of women entering factories during two world wars?

Some judges said this was the wrong approach. They said slow progress in appointing women to company boards and senior management positions meant women had not shaped business as much as many hoped they would. Business was still dominated by men and male attitudes. But it seemed wrong to leave women out; women had influenced business in so many ways. So we settled in the end for women as employees, consumers and leaders.

**Michael Skapinker**  
Editor, Special Reports  
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# People

The rapidly increasing diversity of society has filtered through to the workplace and to how businesses relate to the public, writes *Sarah Neville*





“  
THE OPEN-PLAN OFFICE  
SENT A FASHIONABLY  
DEMOCRATISING MESSAGE  
”

**F**or generations, work – for all but a privileged elite – meant a form of servitude. Employees were supplicants without rights or protection – Bob Cratchit’s reliant on the goodwill of their bosses to secure a day off or a pay rise. But over the past century a revolution has taken place in the control people have over their working lives.

In the west, jobs have become part of an assumed right to self-actualisation. By this creed, a job is part of who we are and we are entitled not simply to a salary but also to satisfaction.

The notion is that employees, cosseted by incentive schemes and tax-deductible gym memberships, will be more likely to stay, and employers will have a better chance of making a return on investment in staff development.

In theory, such benign and respectful regimes also feed and breed employee creativity. But in practice it is harder to hit upon the precise recipe.

As the culture of deference evaporated after the second world war, the open-plan office became a pervasive feature of working life. It sent a fashionably democratising message. But privacy and confidentiality – valuable not only for doing business but also for managing a workforce – suffered.

The open-plan concept has also spawned “hot desking”, in which workers are denied their own space, often in the name of increasing efficiency and teamwork. Many employees, however, feel alienated and infantilised by being forbidden even to customise a work station with family pictures and pot plants.

The variety of people sitting behind those desks, however, is likely to be far greater than it was half a century ago.

A more diverse workplace has been one of the most striking advances since the 1960s.

In reality, however, discrimination continues, often the more insidious for being covert or even unconscious. Managers’ tendency to appoint others in their image means many professions lack a large percentage of upper-echelon staff who are female, from ethnic minorities, gay or lesbian.

Pensions and other benefits have revolutionised our sense of our careers, offering security undreamt of by previous generations. In middle age, fear of sacrificing future pension rights can deter employees from jumping ship, aiding the retention of institutional knowledge.

But, as in so much else, the financial downturn has blurred the picture. The economic crisis has also altered the role played by environmentalism in business thinking.

It first took root in the public consciousness in the 1970s and by the turn of this century, many large enterprises felt they had to adapt products or processes to fit the new sensibility. During a recession, however, most households find it difficult to justify paying the higher retail prices of green products and worries about the environment have slipped down the hierarchy of concerns.

However, those who do care about the environment tend to do so passionately – as many companies have discovered to their cost. Most companies now grasp the importance of dealing with non-governmental organisations – in the battle for public trust the NGOs are likely to win out every time.

And ensuring you are seen to be in tune with your customers’ concerns and value systems is, after all, the oldest and most potent business idea of all.

Fighting for the cause: companies can no longer ignore activists such as the Occupy movement

# 50 IDEAS PEOPLE



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WOMEN BRING DISTINCT WORKING PRACTICES, SUCH AS A FACILITY FOR WORKING AT A STEADY PACE  
”

## 50 IDEAS

### WOMEN AS EMPLOYEES, CONSUMERS AND LEADERS

The recent call by Shinzo Abe, Japan's prime minister, for company boards to have at least one female member highlighted the dearth of women in Japan's corporate sector. Even in Europe and the US, women still fill only a small percentage of senior board positions.

Yet despite the frustration at the persistent gender imbalance, it is easy to forget that the presence of women has transformed the workplace in a short period of time. Of course, in one way or another, women have long been part of industry – and not always as labourers. In the 19th century, after an injury left her husband bedridden and unable to oversee the building of New York's Brooklyn Bridge, Emily Warren Roebling managed the construction.

Significant progress occurred in Europe and the US in the 20th century. After countries started granting all women the vote, the first world war brought women into factories. The roaring twenties also broke down many cultural impediments to women working.

There were interruptions to the trend, such as the Depression in the US, but during the second world war women were employed in unprecedented numbers. Yet as late as the 1950s, UK and

US industries still adhered to “marriage bars” – requiring women to leave their jobs as soon as they married. Britain's foreign office abandoned the marriage bar only in 1972.

Communist revolutions transformed the status of women. In his attempt to modernise the Chinese economy, Mao Zedong recognised that women needed equality if he was to bring them into the workforce in sufficient numbers, while in Russia the ideal proletariat woman was a working one.

Recent studies have found that businesswomen bring distinct working practices to their role – from a facility for working at a steady pace to the ability to maintain a complex web of relationships and to use these to encourage participation and power-sharing.

Yet businesses still struggle to increase female representation at senior levels. This is particularly true in Asia. McKinsey, the consultancy, has since 2007 tracked the role of women in the global workforce. It has found that, on average, women account for just 6 per cent of seats on boards in 10 Asian markets, compared with 17 per cent in Europe and 10 per cent in the US.

The quotas being considered by some countries are the subject of hot debate. For while most agree on the need for a corporate gender balance, consensus on the strategy that will achieve this is still some way off.

**Sarah Murray**

### Making strides: the presence of women has transformed the workplace in a short period of time

## 50 IDEAS

### WORKPLACE DIVERSITY

The average office or business looks very different to the way it did a century or even a generation ago. Where once in the western world white men predominated, women and members of ethnic minorities now enrich the mix of almost every workplace.

In most developed countries, the 1960s and 1970s brought equal pay and broader anti-discrimination legislation designed to ensure men and women received the same remuneration for performing the same tasks.

These legal obligations have allowed businesses to play their part in the valuable human endeavour of ensuring no one's potential should be wasted due solely to their gender or colour of skin.

But offering equal opportunities can also have enormous commercial benefits. The most successful businesses tend to be those that understand the societal shifts that are defining the early part of the 21st century.

The identification in recent years of the “pink pound” – the market for goods and services in demand from the gay population – is a case in point. Moves to ban discrimination on the basis of sexual orientation have led to larger numbers of openly gay, lesbian

PHOTOS: GETTY

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IN THE GERMAN 'OFFICE LANDSCAPE' A CERTAIN DEMOCRACY PREVAILED

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and transgender employees whose expertise can be tapped.

In practice, however, women and some ethnic minorities are failing to secure an equal share of the top jobs in most workplaces. The disparity is striking given that women increasingly perform better than their male counterparts at every stage of academic life.

There is no single explanation for this, but evidence of a widening gap in employment rates as women get older suggests motherhood, combined with the shortage of affordable childcare, is significant. Those who leave jobs to raise a family struggle to regain their place on the career ladder. Research published by the European Commission shows the gender employment gap peaks at 15 percentage points for those aged between 55 and 64. However, women's failure to capture a proportionate share of the career spoils might also reflect their different choices and priorities.

That most of those making senior appointments in the developed world tend to be white men can also make it harder for those who do not fit the prevailing mould. The human tendency to relate to those similar to ourselves can lead to appointments that reinforce, rather than challenge, the status quo. **Sarah Neville**

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IDEASTHE OPEN-PLAN  
OFFICE

The open-plan office has become an urban archetype, engrained in our consciousness – an ineluctable and inescapable element of modernity.

But there is nothing particularly modern about the idea. It originated towards the end of the 19th century, when construction technology using steel beams allowed architects to create big, column-free spaces. These became the clerical equivalent of the factory floor, with workers seated at rows of desks, overlooked by executives in enclosed, glazed offices.

Significant change came, perhaps surprisingly, in postwar Germany. Partly in reaction to the extreme order, surveillance and hierarchy of the Nazi regime, a new, more informal office design began to emerge. Quickborner, a consultancy working alongside a Hamburg office furniture manufacturer, devised the *Bürolandschaft* concept (the “office landscape”). This comprised seemingly random clusters of desks and workspaces

**Creative spaces: achieving a balance between communication and privacy is the key to success**

arranged as islands in a sea of carpet and pot plants.

In fact, this being Germany, the patterns were a result of a rigorous study of how office workers grouped themselves into units to address tasks. Instead of hosting ranks of clerks, these offices encouraged chatter, movement and informality. In this kind of layout a certain democracy prevailed. As workers were promoted, for example, they might stay in or near the same spot, avoiding the envy and dislocation that might have resulted from a move to a separate office.

In the US the landscape was solidified into a version of the older format as offices were sub-divided into cubicles while executives got window offices (corners remaining the biggest prize). Such arrangements ingeniously maintained the worst of both worlds.

Germany, meanwhile, along with Scandinavia, began to abandon the original open-plan model as they found that employees desired more control over their personal environment than the few personal items they were allowed on their islands. Corporate continental Europe began to drift back to quieter, individual offices with windows that could be opened and direct daylight.

The other outcome of the open-plan system has been “hot desking” or “hotelling”, in which itinerant workers are expected to settle wherever there is space for a laptop. It solves the problems of inefficient occupancy but creates new issues of personal space and a sense of belonging. This is linked to the “creative” workspace model, in which workers float around a teeth-clenchingly cliched funscape of brightly coloured breakout spaces, big kitchens and table football areas.

Today a hybrid of tech spaces and laboratories with their generous staircases, landings, write-up spaces and canteens seems to be setting a new open-plan pattern where cross-disciplinary breakthroughs happen.

Change is inevitable and constant in the open-plan office, but that elusive cocktail of communication and privacy is the key. **Edwin Heathcote**



# 50 IDEAS PEOPLE



## PENSIONS AND BENEFITS

Workplace pensions – the old-fashioned kind that set income in retirement as a percentage of the last year of salary earned – sat at the core of industrial modernisation after the second world war.

In the US and the UK especially, officials set wage and price controls to contain the threat of destabilising inflationary spirals amid postwar reconstruction. But those controls coincided with a manpower shortage – pension benefits could be used to attract and retain workers. Both countries experienced a surge in birth rates. With growing numbers of workers contributing to retirement savings and few pensioners collecting benefits, along with double-digit returns on investments, pension promises were a low-cost incentive. In addition, high marginal corporate and personal tax rates made pension contributions cost-effective.

So well funded were the UK's pension schemes that retirement funds became the primary tool for financing corporate restructuring.

Data from the UK's Office for National Statistics suggest workplace pension participation peaked in 1987 when there were 10.6m members of defined-benefit pension schemes.

By then, however, jobs for life were becoming outdated. Laws were changed, so employers had to provide some inflation-proofing on benefits. Total active membership fell slightly to 10.3m up to 1995.

By 2001 new accounting rules that forced companies to make the cost of pension promises clearer coincided with the bursting of the dotcom bubble in share prices and the subsequent collapse in interest rates. Corporate pension schemes became cash drains.

Moreover, rising longevity raised the cost of pension promises that had been made years earlier. In 2003, the average US male worker could expect to spend 18.1 years in retirement, against

11.5 years in 1950. In the UK, it is estimated life expectancy for a male at age 65 will rise from 13.7 years in 1996 to 19.5 years in 2056 and for a female from 17.4 years to 23.4 years.

In the UK's private sector, there are now fewer than 2m active scheme members and about 80 per cent of schemes are closed to new members.

The days of defined-benefit provision have largely come to an end. While much of the blame is placed on a combination of government regulation, accounting rules and the vagaries of markets, there are good reasons to question whether they remain suited to the workplace of the 21st century.

**Norma Cohen**



## ENVIRONMENTALISM

When dozens of world leaders descended on Rio de Janeiro last June for one of the biggest global environmental conferences in 20 years, observers had a dilemma: should they stay in the conference hall to watch the parade of presidents and prime ministers? Or head out to see executives from Microsoft and dozens of other companies at various parallel green business events dotted around the city?

Back at the first Rio Earth Summit in 1992, relations between companies and environmental campaigners were more prickly. Today, the rise of the digitally empowered consumer and environmental activist has driven a profound change. Rarely does an executive voice publicly any private reservations about recycling or climate change.

Instead, companies now regularly compete with each other to prove their green credentials. Coca-Cola and PepsiCo, for instance, have spent many years and dollars trying to beat each other in the race to make plastic bottles from plants. Two other great rivals – Ford and General Motors – now battle over whose vehicles produce fewer carbon emissions.

More than 80 per cent of the world's



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THE PUBLIC IS MORE  
LIKELY TO BELIEVE NGOS  
THAN COMPANIES  
”

500 biggest companies by market value now report information about their impact on the environment to CDP, a London-based non-profit group that encourages such voluntary reporting. It says the overall number of companies making such disclosure has soared from 135 in 2003 to 4,112 in 2012.

But it would be a mistake to ascribe all of this green effort to a sudden urge to do planetary good. Much is driven by a desire to save on energy costs and other expenses, and quite a bit purely for marketing purposes. Still, a number are genuine, and now that companies such as Google are spending nearly \$1bn on renewable energy projects, and Puma is eyeing synthetic leather for its famous footwear, the relationship between business and the environmental movement is clearly entering a very different phase. **Pilita Clark**

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ACTIVISM  
AND NGOS  
IDEAS

When a top Bank of England official said last year that the Occupy movement had been right to attack the global financial system, no one objected. Business leaders know that activists and campaigners often command greater public support than they do.

“Occupy has been successful in its efforts to popularise the problems of the global financial system for one very simple reason: they are right,” Andy Haldane, the BoE’s executive director for financial stability, told a meeting of students, protesters and bankers.

The Occupy movement, whose members camped on the streets of New York and outside London’s St Paul’s cathedral, has not had the staying power its supporters hoped for and its business opponents feared.

But the occupiers are part of a long tradition. Businesses have had to answer to, and occasionally co-operate with, campaigners for years.

Activist groups have changed company policies. Nestlé, the food company, had to limit its marketing of infant milk

formula in the face of protests that it was encouraging mothers in the developing world to feed their babies contaminated water rather than breast milk.

In the 1990s, Shell bowed to pressure from environmental group Greenpeace to break up its Brent Spar oil-storage facility on land rather than at sea, which it had thought was better for the environment. Greenpeace later admitted it had got some of its figures wrong.

The Brent Spar affair told business something important: the public was more likely to believe non-governmental organisations than companies – even, in many cases, when companies had the stronger arguments.

Faced with the difficulty of getting their views across, many companies opted to co-operate with the campaigners. They used NGOs to verify their products, to demonstrate they were kind to rainforests, fair to small farmers or were not depleting fish stocks.

Sportswear and clothing manufacturers worked hard to persuade campaigners they were inspecting their subcontractors’ factories to ensure abuse of workers and employment of minors were not taking place. Nike published the names and addresses of its subcontractors online and encouraged campaigners to tell it where it needed to do more.

In private, companies sometimes grumble that NGOs are not subject to the same scrutiny and their claims are often not challenged. Companies know, however, that, rightly or wrongly, the public trusts NGOs more.

The Edelman Trust Barometer, an annual measure of attitudes to different institutions, found this year that while trust in business generally was quite high, only 18 per cent of the public worldwide trusted business leaders to tell them the truth. More than 50 per cent of people trusted NGOs in most countries surveyed, but that figure was far higher in emerging markets. In Mexico, 83 per cent trusted NGOs. In China the figure was 81 per cent.

Assessing the likely environmental and social impact of any corporate policy is an intrinsic aspect of doing business today. **Michael Skapinker**

Hong Kong haze:  
companies are  
using issues such  
as climate change  
to cut energy costs  
or for marketing  
purposes

# Technology: computers

Computerised information processes have become an essential part of a company's operation, regardless of its size, creating a digitally savvy population of employees as well as customers, says *Richard Waters*

**I**t is 62 years since J Lyons, a baker and catering company once famous in Britain for its tea shops, turned on the world's first commercial electronic computer.

The machine went on to perform, in rudimentary form, many of the functions of a modern information technology system, from payroll calculations to managing daily orders coming in from the company's shops.

The rest, as they say, is history. IT now sits at the heart of the modern corporation – globally co-ordinated and responding instantly to market signals.

Yet the information revolution also threatens to devour the traditional corporation, as the latest advances in technology increase the pace of change.

Primitive forms of information storage and processing were harnessed for business use long before the emergence of electronic computing. Punched cards ruled from the early 19th century, when they were used to control textile looms, to the middle of the 20th, when they provided a medium for storing data and simple computer programs.

However, it was only with the arrival of general-purpose programmable computers that the full force of IT hit business. A remorseless decline since then in the prices of information processing and storage, as well as communications, has brought it out of the back-room and turned it into something on which most of a company's workers and customers now depend.

Mobile communications and social networking represent the latest phase. The upshot is a digitally savvy – and permanently connected – population of customers and employees. Many have also learnt how to tap into new information networks. As a result, large parts of the media, marketing and retailing industries are facing pro-

found changes as digitally empowered customers change the way they shop or seek to be entertained.

Other technology revolutions on the horizon also threaten to have a huge impact on business. It is true of all transformative new technologies that their true long-range effects are seldom anticipated at the outset.

Their first users see them as tacking existing tasks more efficiently, rather than as tools that make entirely new things possible. And as established businesses often discover to their cost, it is new market entrants who are often the first to find out how to exploit these new technologies.



The microchip, or integrated circuit, has been the basic building block of scientific and technological progress since the second half of the 20th century. Its invisible powers have been an enormous boon to business almost from the start.

First created in 1958, the chip has launched space missions, modernised corporations, revolutionised world trading and, through progressive miniaturisation, put power that was once the province of room-sized supercomputers into a smartphone that can fit in the palm of a hand.

Jack Kilby of Texas Instruments and Robert Noyce, co-founder of Intel (short for Integrated Electronics), are jointly credited with coming up with the integrated circuit, by different means, at about the same time.

The transistor had appeared a decade earlier, an invention at Bell Labs that could finally replace the bulky and



expensive vacuum tubes used in electronics in the first half of the century.

That transistors and their circuit boards would quickly be superseded by microchips in importance shows the pace of innovation in the latter half of the last century.

Ever more complex electrical circuits were being designed for the transistor, but soldering components and wires together proved expensive in time and money, while connections were prone to failure.

Kilby and Noyce figured out that components and wires could be made from one material – silicon – and shaped as well as combined together on a single chip.

The modern process known as photolithography “prints” chip designs on silicon wafers as ultraviolet light is passed through stencils, or masks, that detail the circuitry.

The latest chips from Intel have circuit widths of just 22 billionths of a metre and, while Intel’s first microprocessor in 1971 had 2,250 transistors, 6m of them from 22-nanometre chips could now fit on the full stop at the end of this sentence.

The benefits for business are tangible – and highly visible. The chip powers the personal computer, the tablet and the smartphone that have become the main tools of employees. It is at the heart of the servers that run the internet, store our data and carry out ecommerce transactions.

More powerful computing is making it increasingly possible for businesses to predict weather patterns, make energy discoveries, develop more effective drugs and analyse their sales and customer behaviour for the “big data” clues to their future success. In little more than half a century, the chip has become the very heart of business.

**Chris Nuttall**

# 50 IDEAS TECHNOLOGY: COMPUTERS

## 50 IDEAS INTERNET

The internet was not designed for business – and it shows. Based on a protocol for enabling easy interconnection of existing communication networks, its founders took a “lowest common denominator” approach in order to ensure the broadest possible adoption.

One result of this was the lack of an in-built method of authenticating users, adding to the security vulnerabilities that have left businesses more exposed to online threats like denial of service attacks and intellectual property theft. Yet the same ease of interconnection also ensured the rapid adoption of the medium, turning the network-of-networks into one of the most powerful forces on the evolution of business over the past quarter of a century.

At first, the internet was seen primarily as a new, low-cost channel for existing businesses to reach their customers. Its disruptive power, however, quickly became apparent.

A collapse in digital distribution costs – and the sudden availability of a global online audience – drastically lowered the barriers to entry to many information-based industries. The result was an investment mania in internet start-ups that produced the dotcom boom and bust of the late 1990s.

The second wave of online innovation that followed has proved less volatile. Rather than simply transferring existing ways of doing business to cyberspace, many of the new business approaches have sought to take advantage of the medium’s particular characteristics.

Harnessing communication and interaction between users, for instance, has become a key to many forms of online business success. Marketing is in the process of being transformed from a one-way form of communication into a two-way conversation in which customers talk back – or to each other. Media companies have found that audiences often prefer content created by



**It’s personal: a post-PC era could mean laptops and personal computers are succeeded by tablets and smartphones**

themselves or their friends – and that they demand the right to choose the time and the device on which they seek information or entertainment, breaking old programming models.

The spread of touch-screen smartphones following the debut of the iPhone in 2007 has brought a new twist. Companies that were still learning the new digital rules of the road that followed the first phase of internet adoption now find themselves with a completely new set of challenges to master, as “mobile first” becomes the mantra for connected businesses.

**Richard Waters**

“THE PC REPLACED TYPEWRITERS BY GIVING BUSINESSES SPREADSHEETS, DATABASES, AND WORD PROCESSING

”

## 50 IDEAS PERSONAL COMPUTING

The move from mainframe to personal computers democratised the use of computers, making their power available to individuals rather than being confined to governments, academia and big corporations.

Personal computers gave businesses new flexibility and toolsets. Spreadsheets, databases, word processing and computer-aided design increased productivity and replaced the typewriter, the calculator and the drawing board.

The desktop computer was a hobbyist’s pursuit in the 1970s, notably at the Homebrew Computer Club in Silicon Valley, where Steve Wozniak and Steve Jobs showed off the Apple I and Apple II home computers.

IBM’s introduction of the Personal Computer in 1981, which cemented the term PC, was partly inspired by the success of the Apple II. It used off-the-shelf components, including an Intel processor, along with an operating system from Microsoft, to bring the product to market quickly.

This first PC was too expensive for consumers at \$3,000, but its 64kb of memory and floppy disk drive appealed to businesses looking to modernise their processes.

It was Xerox’s Palo Alto Research Center in Silicon Valley that came up with the mouse and graphical user interface, but it took Jobs and the Macintosh, introduced in 1984, to exploit these and make them the preferred companion of the keyboard.

Affordable, battery-powered laptops have been around since the mid-80s, but this century they have become challenged by tablets and smartphones in what is being described as a post-PC era.

And yet the PC still plays a dominant role in the workplace. With new interfaces emphasising gestures, voice and touch being introduced, business is likely to find new uses for the PC for some time to come. **Chris Nuttall**



“  
SEARCH ADVERTISING, BARELY  
INVENTED A DECADE AGO, NOW  
ACCOUNTS FOR NEARLY A HALF  
OF ALL ONLINE AD SPENDING  
”



DATA ANALYTICS  
AND SEARCH

The systematic application of data to business management had its first flowering a century ago, with the birth of disciplines such as “scientific management” and market research.

Yet an explosion of the amount of information available online – and a similar rapid increase in the data that could theoretically be captured and analysed for business use – has ushered in a new golden age in the twin disciplines of information retrieval and data analysis.

Making sense of all the digital information has already produced one of the business success stories of the age in the form of Google. By helping internet users find the needle in the haystack, search has also proved a boon for other businesses, making it easier for them to be discovered amid the online crush. Search advertising, barely invented a decade ago, now accounts for nearly a half of all online ad spending as a result.

Meanwhile, thanks largely to the plummeting costs of collecting and storing information, the volume of raw data being produced has increased exponentially. About 90 per cent of the data currently in existence was created in just the past two years, according to IBM.

That has made “big data” the latest buzzword in the information technology world, as businesses look for new insights about their customers and markets. Data scientists – business analysts with the skills to extract meaning from the deluge of information – have become highly sought-after as a result.

The application of big data analysis to business is starting to bring a more scientific dimension to many aspects of decision-making as the suppositions on which managers were once forced to rely are being put to the test.

At the same time, the ability to draw on data from areas that once seemed unrelated is starting to yield valuable business intelligence. How people behave on social media sites, for

instance, is now being studied for clues about their creditworthiness by some online lenders.

The latest advances in data analytics involve the application of real-time analysis to very large bodies of information, turning business decision-making into a far more dynamic pro-

cess. In some markets, for instance, pricing is rapidly becoming a moment-to-moment decision – with algorithms rather than human beings making the split-second decisions about when to raise or lower prices in response to demand and other factors. **Richard Waters**



spending an increasing amount of time on social media platforms such as Twitter, LinkedIn and Facebook, which has 1.1bn monthly active users, half of whom use the site every day.

In China, where foreign social networks are blocked, homegrown platforms such as Sina Weibo are flourishing. A survey by consultancy McKinsey last summer found that nine in 10 Chinese internet users had visited a social media site during the past six months, compared with 67 per cent in the US.

Companies have been quick to follow their customers on to social media platforms, attracted by the ability to engage directly with their audiences and at a lower cost than through traditional media such as television and newspapers.

Coca-Cola has 65m “likes” on Facebook and about 800,000 followers on Twitter. The ease of sharing content on these platforms means a well-judged post has the potential to “go viral” and reach a vast audience.

However, social media campaigns can go wrong. McDonald’s last year launched a Twitter campaign that asked customers to share their experiences dining at the fast food chain. But it backfired when people used it to highlight their horror stories.

Despite the occasional mis-step, brands are continuing to pour money into social media. The \$10bn valuation that investors have placed on Twitter is testament to that.

Facebook, which has a market capitalisation of \$64bn, has a massive database of consumer information but is only starting to make money from that through advertising.

**Robert Cookson**

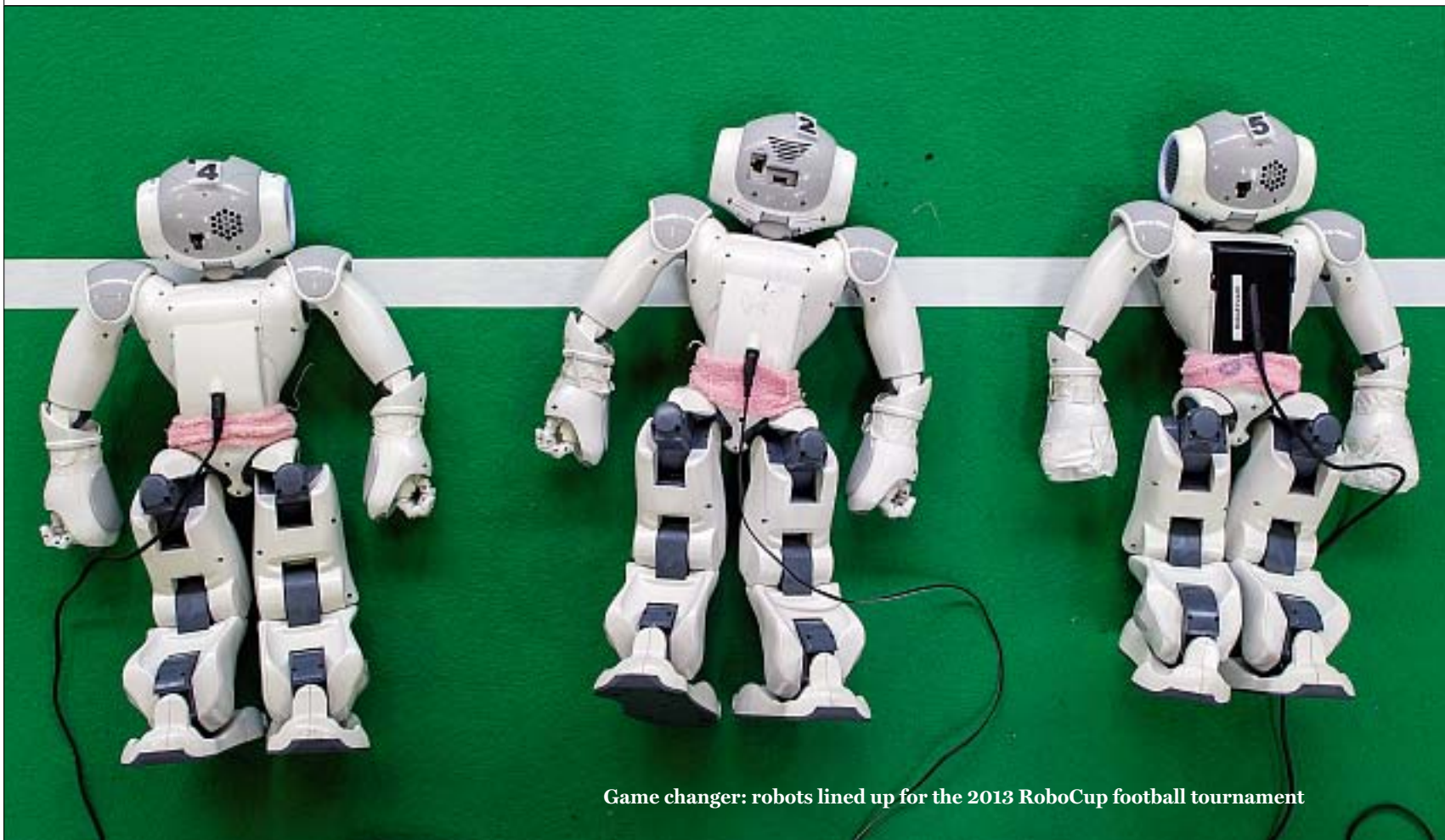
**Light of publicity: people are spending more of their time on social media, with companies also following suit after realising that they can reach a vast audience with limited cost**

When hackers took over the Twitter account of Associated Press in April, they triggered a sell-off that wiped billions of dollars off the value of global stock markets.

The anonymous saboteurs sent a bogus tweet from AP’s main account to its 1.9m followers, saying: “Breaking: Two Explosions in the White House and Barack Obama is injured.” Markets rebounded as people realised the tweet was fake, but the incident was one of the most dramatic demonstrations yet of the influence that social media wields over business and finance.

From London to Delhi, people are

# Technology: applications



Game changer: robots lined up for the 2013 RoboCup football tournament

Faster, smaller and, above all, smarter, electronic technologies have dramatically redefined time and distance for businesses and their employees. *Clive Cookson* introduces six of the most significant

**M**ovement and communications are at the heart of modern industrial society and the businesses that thrive on it. People expect to receive relevant information and entertainment wherever they are – at home or travelling across continents – and companies have to keep track of their goods as they progress around factories and along supply chains.

Over the past 25 years, particularly the past decade, a group of tracking, communicating, imaging and reading technologies have come together to make this possible. They are based on computing and electronics with a strong strand of materials science – as, for example, in the development of thin glass strands that can transmit laser pulses over vast distances with little loss of light.

Light (optoelectronics) and radio transmissions have together transformed telecommunications. For

PHOTO: GETTY

“  
BY THE TIME THE IPAD  
ARRIVED, THE BARRIERS  
BETWEEN WORK AND HOME  
LIFE HAD BEEN DEMOLISHED  
”

long-distance point-to-point communications, nothing can beat the reliability and capacity of fibre optics (though we should remember that the vast majority of the world's homes and businesses still depend on old-fashioned metal wires for local connections).

Mobile communications, of course, use radio. The technological key here was the development of a cell-based system of microwave transmitters and receivers that pass the user seamlessly from one to the next. With each new generation of mobile technology, data capacity has vastly increased, providing the infrastructure for all the social media that have sprung up recently.

Because radio waves travel in straight lines and the earth's surface is curved, long-distance radio communications require the signals either to bounce off a satellite or to be transmitted in a series of hops along a line-of-sight chain of microwave towers.

The latter option might sound cumbersome, but some specialist business areas are keen to take advantage of the fact that light travels faster through the air than along glass fibres. In, for instance, high-frequency financial trading, it can pay to shave milliseconds off data transmission times between geographically separate markets.

Satellites boosted the development of the long-distance telecoms industry and are still important for mobile communications in remote areas. But today their largest commercial role is in television broadcasting.

Alongside mobile communications, electronic processing of images and other visible information has been a transformational technology for a wide sweep of businesses. This covers far more than digital photography, which first threw film photography into near-terminal decline and then helped to popularise smartphones.

Imaging lies at the heart of the huge medical devices industry. In addition to two-dimensional X-rays, doctors can look at patients with newer techniques that reveal much more about what is going on inside the body, from CAT (computer axial tomography) and ultrasound to MRI (magnetic resonance imaging) and PET (positron emission tomography) scans. Computer analysis of the images permits diagnoses that would have been impossible with traditional radiography.

Image analysis has also made possible a new wave of security and identification applications, such as facial recognition. And automatic reading of printed tracking labels – barcodes and their later manifestations, such as QR (quick response) codes – has transformed retailing and logistics.

Computer vision will also be essential to the development of robotics, the last of this group of six top technologies that have shaped business. Blind and inflexible industrial robots have transformed some manufacturing operations, such as car production, but there is scope for more intelligent and adaptable robots with senses of sight and touch that can adapt to, for example, irregular or unexpected movements on a production line.

Then there is the prospect of new robotic markets, such as humanoids that can act as personal companions or domestic assistants. Aerial robots inspired by birds or insects could fly to places inaccessible to conventional piloted craft. And fish-like aquatic robots could penetrate waters beyond the capabilities of boats or submarines.

We cannot predict what future technologies will come out of military, academic or industrial research. But on past form we can be confident business people will exploit any commercial opportunities that arise.



MOBILE  
COMMUNICATIONS

Of all the technologies that affect business, mobile communications are perhaps the most revolutionary. Although the first mobile phone was demonstrated in 1973, it was not until the mid-1990s that they began to be adopted more widely. From that point, working life would never be the same.

First, there was the car phone, which allowed salespeople to keep in touch with the office and clients while on the road and respond more quickly to opportunities. Then came mobile phones – not exactly pocketable, but they would fit in a briefcase. Text messaging – originally a service feature for mobile phones – soon took off.

But it was the arrival of mobile data that really transformed business. The once ubiquitous BlackBerry – initially given to employees as a second device alongside their phone – introduced the concept of “always-on” working. Employees could respond to emails, which were by then the mainstay of business communication – anywhere.

Laptops soon became equipped with mobile data, and fast public WiFi sprouted up in cities. By the time the iPad arrived in 2010, offering a truly portable alternative to boxy company laptops, the barriers between work and home life had been demolished. If you were awake, you were online.

The technology kept pace. Over the past 12 years, WAP, GPRS, Edge, 3G and now LTE have allowed us to send larger documents, pictures and more recently even hold videoconferences from almost any location.

The revolution is not only internal. The relationship with the customer has

# 50 IDEAS TECHNOLOGY: APPLICATIONS



SOON DEVICES WILL BE ABLE TO SCAN OUR BODIES AND SHOW US HOW A PAIR OF JEANS WILL LOOK



been transformed, most profoundly in the retail sector. Shoppers can browse, buy and pay with their mobile phones. Mailing lists and catalogues have been replaced by flash offers by email or text.

Customer service is no longer just a two-way conversation. People can tweet their dissatisfaction, or check a competitor's price by scanning the barcode with their phone. In exchange, retailers can know their customer as never before. They can track purchases or respond to a complaint before a customer has left the shop.

In the media and advertising, companies are finding new ways to reach mobile audiences. A large proportion of music and software is now sold through app stores rather than over the counter. In healthcare, mobile technology has the potential to allow real-time monitoring of our bodies throughout our lives.

Machine-to-machine communication (the "internet of things") is also taking off. Before long, electricity smart meters will feed real-time energy use data back to the grid, or car parts will send maintenance data back to service centres, for example. **Bede McCarthy**



**Getting smart: mobile phones now let you shop and let the shops know more about you**

## 50 IMAGING TECHNOLOGY IDEAS

Ever since printers were first able to reproduce drawings, advertisers have been using images to communicate desire to their customers instantly and with impact.

The use of images gave rise to catalogues and mail order shopping – the parents of today's ecommerce and retail sites. The product photography that makes these inanimate objects desirable has helped technology companies such as Apple both create and target consumers' seemingly endless obsession with shiny new products.

In the world of commerce, bigger is better, so printing technology has been pushed to the limit, allowing images to cover the sides of skyscrapers or an airliner's fuselage, for example. Everywhere we turn we are confronted with images – and most of them are selling something.

Imaging has allowed scanning – of

barcodes and the newer quick response codes to identify places, products and promotions. Such technology has turned stock and supply-chain logistics into an exact science. In the giant warehouses of internet retailer Amazon, every action is recorded by a scanner.

Soon devices will be able to scan our bodies and use clever software to show us how a pair of jeans will look on us, without us having to leave our chair.

Imaging has spawned entire areas of work – photographers, retouchers and printers – and product lines for equipment and lighting. And as analogue imaging has given way to digital, some giants of the past have fallen, such as Polaroid and Kodak.

In the office, the humble fax machine – a breakthrough device when it appeared that had the then revolutionary ability to scan documents and send them across phone networks – is already obsolete. But its stablemate, the photocopier, is not.

The imaging category also includes ultrasound, used to detect flaws in objects as diverse as precision engineered components and babies in the

## 50 FIBRE OPTICS IDEAS

Fibre optics – the science of trapping light and directing it from one point to another – is often associated with cutting-edge technology, when in fact its use dates back to the 1840s when French academics discovered that light trapped in a stream of water could travel around bends.

However, it was perhaps not until the mid 1960s, when German physicist Manfred Börner started sending data using light instead of electrons, that its fundamental importance to business emerged. Today, a single fibre scarcely thicker than a human hair can carry about 90,000 television channels. The technology is also immune to electrical interference and environmental noise, safe to use around explosive fumes and



difficult to wire-tap. Little wonder, then, that it is optical fibres that form the backbone of the internet, ferrying data along submarine cables that connect every continent except Antarctica.

The speed, size and bandwidth of fibre optic technology has been transformational for business. Colleagues on different continents can collaborate via services such as videoconferencing and screen sharing, giving new meaning to the concepts of multinational companies and home-working.

Without fibre optics, the internet might not have kept pace with the development of the electronic office with its VoIP (voice over internet protocol) phones and the older email systems replaced by cloud-based versions. Fibre optics have also enabled the birth of the consumer internet and digital media, which have demonstrated a hunger for bandwidth that few could have predicted when copper cables were being laid.

PHOTOS: EYEVINE; GETTY



womb. And radar, which made possible today's busy but safe airspace. And for companies that make things, the ability to scan a prototype, feed the image directly into a computer-assisted manufacturing process and turn out exact replicas has slashed time and costs, allowing for quicker reactions to changing market conditions.

Imaging has redefined security and identity checks. And with facial recognition technology now in modern smartphones, a person's image has become the key to their digital life.

There is more to come. In the age of Instagram, the online photo hosting service, people increasingly communicate using pictures rather than words or speech.

The first version of the Google Glass wearable imaging device will let you take a picture by blinking, and it will not be long before we will be able to record our life in high-definition video.

Some call this the death of privacy. That may be, but it is also the birth of a new commerce. **Bede McCarthy**

In the office itself, fibre optic cabling uses a fraction of the space of traditional network and telephony infrastructure, meaning higher ceilings and more spacious office designs.

In medicine, fibre optics can not only shine light into inaccessible places but are also used for endoscopes, the tiny cameras used for internal examinations and surgery that have transformed the medical industry. They have led to the widespread use of less invasive keyhole surgery, which in turn has reduced patient stays and cut costs for hospitals.

In manufacturing, products can be built with tiny fibre optic sensors that measure strain, temperature and pressure. These give manufacturers real-time intelligence about the performance of their products after they ship. For example, the health of an aircraft engine can be monitored, in some circumstances even enabling engineers to predict failures. **Bede McCarthy**

**Sent on its way: the fax machine was a breakthrough imaging device but is obsolete**



## BARCODES

Few retailers, manufacturers or distributors could run a business today without tracking individual items by computer, whether they be groceries at a supermarket checkout, goods on a production line or parcels at a postal sorting office.

The original – and still the most familiar – tracking device is the machine-readable barcode. Although simple barcodes were introduced in the late 1960s to track rail wagons and factory components, the technology's breakthrough came in the 1970s when the US supermarket industry decided the time had come to introduce a standardised system for automating checkouts. The initial frontrunner was a "bullseye" system proposed by RCA, in which an 11-digit product code was encoded in concentric rings. But trials showed this to be unreliable and the eventual winner was a linear code developed by IBM, with data encoded in the width and spacing of parallel black and white lines read by a laser scanner.

By the 1980s the linear system had been adopted worldwide, with information allocated according to an agreed universal product code (UPC).

From the shopper's point of view, the most obvious benefit of barcodes is that – when

they are working properly – they speed up the checkout process. For retailers, this means they can employ fewer staff at the tills – an accelerating trend now that many chains are encouraging, or forcing, customers to scan their own purchases at a self-service machine.

More important advantages for companies lie in their being able to track and re-order stock, respond quickly to changes in demand and alter prices far faster than is possible with manual pricing systems.

Although the UPC remains the dominant form of barcode, many other codes are in use for more specialised commercial applications, from books and libraries to pharmaceutical packaging.

The familiar linear barcode exemplified by the UPC reads across from left to right in one dimension. But the main growth area in labels is now in 2D or matrix codes that can hold much more data; they are printed as a grid with tiny black and white squares that are read both horizontally and vertically.

The most important 2D system is the QR (quick response) code. It was invented for the Japanese car industry

but has recently spread rapidly as the de facto standard for labelling objects with information and internet links that can be read with mobile phones – laying the foundations for the so-called "internet of things".

At the same time, radio frequency identification (RFID) tags – smart labels that can be read without

an optical scanner or camera needing to have a line of sight to the code – are multiplying rapidly in many fields of commerce, supplementing or even replacing barcodes.

**Clive Cookson**

“ THE UPC BARCODE READS IN ONE DIMENSION, BUT THE GROWTH AREA IS IN 2D OR MATRIX CODES ”



# 50 IDEAS TECHNOLOGY: APPLICATIONS

“  
COMMERCIAL SPACE  
ACTIVITIES ARE NOW WORTH  
\$200BN WORLDWIDE  
”

## 50 ROBOTICS IDEAS

Robots may have yet to show they can take over the world – a vision of many science fiction writers – but they have made a considerable mark on the field of manufacturing.

Industrial robots – programmable, multifunctional manipulators – are ubiquitous in factories making products from cars to chemicals. The systems take care of tasks that, if the machines had never been invented, would have been left to humans.

Jobs commonly performed by robots include welding car bodies, screwing together electronic devices and lifting any number of different items between machines at various stages of production.

It is a mistake, however, to blame robots for declining employment in manufacturing. Without the productivity improvements robots have made possible, the companies that use these devices, often with a few human employees to supplement their work, would struggle to be competitive. Indeed, without robots the companies might not be in business at all.

The Czech Karel Capek's 1920 play *R.U.R.*, which was translated into English three years later, coined the word “robot”. The main character was Rossum, an engineer who made android machines with a wonderful capacity for work. These robots, which start off as servants of mankind, eventually learn to think for themselves and overcome their human masters.

In the business world, robots have had a less dramatic though still eventful history. Industrial robots were first made in the early 1960s by the long-since-disappeared Unimation of the US. Today, the biggest makers of robots include ABB of Switzerland, Germany's Kuka and Fanuc of Japan.

Robots' capabilities are increasing year by year, including their ability to sense their surroundings through vision and touch systems. As a result, they can show some measure of adapt-

ing to their environment, such as “watching” for components approaching on a transfer line in irregular movements and grabbing them at the appropriate time.

Small companies, such as Rethink Robotics, based in Boston, have started to produce fairly cheap, highly adaptable robots that can work alongside humans. These machines use techniques of “smart” computing, or artificial intelligence, to offer a considerable amount of autonomous thinking. But truly autonomous robots – ones with the thinking power of the average human – have still to evolve. **Peter Marsh**



**Global reach: robots have yet to conquer the world, but satellites have become essential to broadcasting**



## 50 SATELLITES IDEAS

In October 1957 the Soviet Union shocked the world by launching its first man-made satellite, Sputnik. Less than five years later space technology went commercial when the US launched Telstar 1, the first communications satellite, which transmitted television broadcasts and telephone calls across the Atlantic.

In 2012, 50 years after Telstar 1 went into orbit, commercial space activities were worth more than \$200bn

worldwide. Long-distance telephony had driven the expansion of commercial satellites in their early years, but with high-capacity fibre optic cables providing the backbone for intercontinental telecommunications, satellite broadcasting makes up the largest part of the space market.

Direct broadcasting from space to homes began in the 1980s, when technology made it possible to build sufficiently powerful and reliable “geostationary” satellites. In this orbit, 36,000km above the equator, a spacecraft appears to hover over one point on earth and its broadcasts can therefore be picked up with a fixed receiving dish.

The second great business opportunity based on satellites is navigation. This originated as the Global Positioning System (GPS), a military project created by the US Department of Defense during the 1970s and made freely available for civilian use in the 1990s. Russia has something similar called Glonass, and Europe and China are building their own systems.

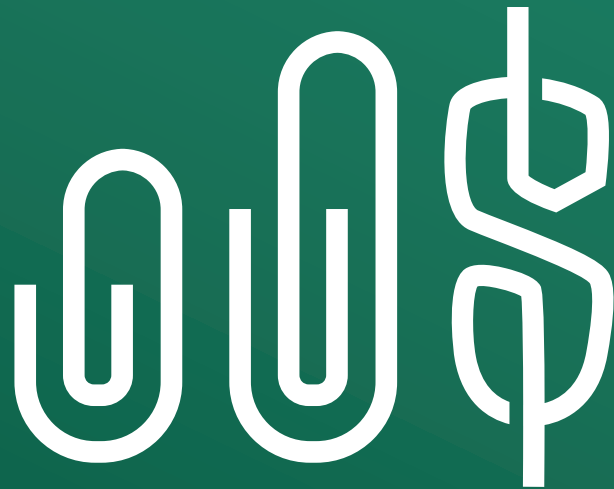
In contrast to satellite broadcasting and telecommunications, sat nav uses constellations of spacecraft that whizz around the earth in lower orbits. A user's position is determined by the time taken for radio signals to travel between the receiver and four or more satellites equipped with ultra-accurate atomic clocks.

Many business activities have become dependent on sat nav, from all forms of transport to mobile communications.

A third multibillion-dollar commercial sector emerging from satellite technology is earth observation, or remote sensing. Like sat nav, this originated in defence research and development. Pictures once generated by satellites for espionage purposes are now commercially available for mapping applications, such as Google Earth.

Observations from environmental monitoring and meteorological satellites are also feeding growing business sectors, such as commercial weather forecasting. **Clive Cookson**

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For all its benefits in spreading wealth, globalisation has not come without drawbacks, making the process one of the most complex forces of modern times, writes *Martin Wolf*

# Globalisation



“  
GLOBALISATION HAS CREATED  
HUGE INCREASES IN PROSPERITY,  
NOTABLY IN EMERGING MARKETS  
”

**G**lobalisation is the great economic theme of the past three decades, affecting not just business

but much of the world as a whole. Behind it are technical factors such as the revolution in information and communications technology, and market-oriented liberalisation – principally of trade and finance but also to some extent of movement of people.

Globalisation has created huge increases in prosperity, notably in emerging markets, above all in China. It has reshaped the activities of business, creating integrated chains of innovation, production, marketing and distribution. Yet it has also caused huge stresses as production has shifted to low-wage economies, “winner-takes-all” markets have increased inequality and destabilising speculation has unleashed huge global financial crises.

In response, the financial sector is being re-regulated. New currents in post-crisis regulation risk balkanising the global banking industry.

Even the impulse towards trade liberalisation has slowed, though not yet reversed, as unemployment has soared in high-income countries gripped by the global and eurozone financial crises.

Some might fear a collapse of this era of globalisation, as happened in the late 19th and early 20th centuries. Yet the position today is not so dire. What we are seeing, instead, are inevitable tensions between two powerful forces.

On the one hand, the market economy seeks opportunities across national borders. Most manufacturing, finance and any service that can be digitised are

highly tradable. On the other hand, political institutions, regulatory frameworks and human loyalties are national or even local. Destabilising this uneasy balance has been a loss of trust in the justice and efficiency of the market economy.

The 1980s and 1990s saw the collapse of Soviet communism and the abandonment of state planning in China and India; the completion of the Uruguay Round of trade negotiations, which incorporated emerging countries into the trading system; abandonment of exchange controls in almost all high-income countries and many emerging economies; privatisation of state-owned enterprises; and the emergence of a mass consumer market across the globe.

This was the heyday of market optimism, unleashed by the US and the UK and, more importantly (and more pragmatically), China and India. Since then, financial crises have undermined such easy confidence. The Asian crisis made many emerging economies wary of the embrace of global market forces. The crisis in the high-income countries is now doing the same to them.

Yet the forces driving globalisation remain powerful. They include the rise of English as a world language; the cross-border movements of people seeking better education and jobs; the rise of a planetary economic and business elite running global companies and living in global hub cities; and the trans-border flows of ideas, including religion.

The backlash against globalisation is also real, though. The desire to regulate markets more tightly, reduce inequalities and achieve a greater measure of personal economic security are all potent.

The outcome will probably be a complex balance of globalisation and regulation. The glad, confident morning of the global market economy has passed into a cloud-covered day.

50  
IDEAS

GOVERNMENT  
REGULATION

In classic economics, the “tragedy of the commons” is the proposition that individuals acting in their own self-interest will foul or deplete shared resources. Outside intervention, the theory goes, is necessary to protect the things that benefit everyone but are owned by no one.

The late 19th century provided dramatic demonstration of the principle as rapid industrialisation transformed Europe and North America. Innovations flourished and vast fortunes were made – but pollution fouled the air, workers had to toil in appalling conditions and dangerous products were foisted on an unwary public.

The catastrophic 1911 Triangle Shirtwaist factory fire in New York led to a wholesale revamping of occupational safety regulations, and other worker and consumer protection rules followed. Oil, financial and railroad monopolies inspired the creation of competition authorities.

The Depression then sparked comprehensive financial reforms. That has been echoed more recently, with tough new regulations aimed at preventing a repeat of the 2008 bank collapses. The financial services sector is also being reshaped by tougher enforcement of existing regulations, especially against market abuse and mis-selling of retail products.

The proliferation of regulation does have downsides. Most rules increase costs and make it harder for new businesses to start. Participants in regulated markets can also become over-dependent on the rules. **Brooke Masters**

# 50 IDEAS GLOBALISATION



50  
IDEAS

CHINA'S ADOPTION  
OF MARKET  
ECONOMICS

To many outside China, the country's impressive economic growth over the past three decades is the natural result of a decision to abandon Communism and adopt free-market economics.

But that decision was never made, and to this day China's increasingly capitalist leaders speak reverentially about Marxist-Leninist Mao Zedong thought and refer to their system as "socialism (with Chinese characteristics)".

One of the most transformative global developments of recent decades is still not fully acknowledged by those who made it happen. The future of that experiment remains a topic of debate at the highest levels of China's authoritarian political structure.

"The ambivalence of the leadership has led to a messy stir-fry of Leninism and a market economy," says Leslie Young, professor of economics at Cheung Kong Graduate School of Business in Beijing. "Allowing the ruling hierarchy to make money while maintaining nostalgia for Marxism has resulted in the party never fully legitimising the assets they control as private property."

It all began in 1978 when the old Communist guerrilla Deng Xiaoping

solidified his grip on the party and launched a modernisation programme following the death of Mao and the end of the disastrous cultural revolution.

In explaining his adoption of what were effectively capitalist ideas, Deng is said to have told comrades: "It doesn't matter whether the cat is black or white, as long as it catches rats."

But right up to his death in 1997 he faced staunch opposition from conservative hardliners in the party and neither he nor his successors ever stopped describing the system as "socialist".

The first steps in what became known as "reform and opening" were taken in the countryside, where tens of millions had died in the great leap forward of the late 1950s as Mao collectivised the land and forced peasant farmers to produce steel.

Beginning in the late 1970s, the party broke up the communes and allowed households to farm their own plots of land. Peasant farmers and state factories were allowed to sell anything they produced beyond state quotas – and private businesses began to flourish.

This continued throughout the 1980s, but it was in the wake of the 1989 massacre of protesters in Beijing's Tiananmen Square and the demise of the Soviet Union that the isolated and uncertain Chinese leadership launched privatisation and price reforms, adopting market economics in practice, if not name.

**Time to reflect: intense growth has brought China to a crossroads and it must decide on market reforms, say economists**

The sudden inclusion of one-fifth of humanity into the global labour market and the willingness of those new workers to toil for a pittance has been one of the most fundamental shifts in the world economy. Particularly in high-cost developed economies, observers described a giant sucking sound as manufacturing jobs went to China.

On the other hand, the cost to western consumers of everything from televisions to T-shirts plummeted as China became the workshop of the world.

As China produced more and more of the world's goods it developed a seemingly insatiable appetite for raw materials. By the mid-1990s it became a net importer of oil and other industrial commodities, driving the commodity super-cycle of the past decade.

But the trend towards an open market economy and integration into the global system has not been entirely smooth. Most economists believe China's export-oriented, investment-intensive growth model is running out of steam and that the country stands at a crossroads.

Famed Chinese economist and free market advocate Wu Jinglian has said China must either launch bold new reforms to introduce a truly market-based economy, or possibly slip instead into a sordid form of crony capitalism.

In today's China, it seems the cat is neither black nor white but a dirty shade of grey. **Jamil Anderlini**

PHOTOS: GETTY; CORBIS

“COUNTRIES GUARANTEE THE RULE OF LAW WHEN THEY PROVIDE FAIR AND EQUAL LAWS APPLICABLE TO ALL

”

**50 IDEAS** PRIVATISATION AND THE RISE OF CAPITALISM

Privatisation has a long history, starting with monarchs and rulers selling state assets and licences to private individuals. But more recently it was an idea that blossomed in the 1980s.

The UK's Thatcher governments, between 1979 and 1990, embarked on selling state assets in mass public offerings of shares, swapping ongoing profit streams of nationalised industries for windfall revenues that were used to plug holes in fragile public finances.

In the process of marketing the equity, the UK government created an army of small shareholders.

**New lines on ownership: the UK's sale of state assets such as telecoms in the 1980s became a worldwide phenomenon**

in forcing inefficient and often corrupt state-owned enterprises to modernise in both former communist countries and market economies.

Over time, many studies showed it was not the change of ownership that most drove efficiencies but opening markets to competition. Where privatisation has been least successful, such as in the cronyism that accompanied Russia's transition to capitalism, state monopolies were seized by small groups with vested interests but without the liberalising force of competition. Greater competition has transformed, for example, communications services around the world.

Many countries, including the UK, have few state-owned companies yet to privatise, apart from banks that the state was forced to nationalise in the financial crisis, but there is pressure for many crisis economies in the eurozone to sell government-owned assets to improve their efficiency and reduce gross public sector debt. In China, the world's second largest economy, the process of attracting private capital to its large state-owned enterprises has a long way to go. **Chris Giles**

*the Wealth of Nations*, economic activity and innovation will thrive only in an environment that affords secure property rights and effective freedom of contract.

Having a transparent legal system and an independent judiciary in which no one, including the government, is above the law is seen as key to retaining business confidence. In countries with strong legal systems such as the UK and US, the rich and powerful can, and are, prosecuted in the courts, and government decisions are regularly challenged by independent judges.

“There is a close correlation between a high prevalence of corruption and a weak rule of law,” says Robert Barrington, executive director of Transparency International UK, an anti-corruption organisation. “Therefore, where there is a strong rule of law, corruption is likely to be less and there is a general pattern of strong independent institutions like the judiciary, an independent media and law enforcement.”

Countries guarantee the rule of law when they provide fair and equal laws applicable to all, a legal system accessible to all and an effective court system.

Confidence in the integrity of the UK legal system is high – as demonstrated by litigants from the former Soviet Union opting to have civil disputes heard in the English courts.

Russia slipped from 63rd out of 142 countries ranked for economic competitiveness by the World Economic Forum in 2011 to 66th a year later, due in part to corruption and a lack of legal reform. The jailing of Mikhail Khodorkovsky, Russia's one-time richest man, is one case where questions have been raised about the impartiality of the Russian justice system.

Likewise in some of Africa's mineral- and oil-rich nations, their natural assets have often proved a curse in the past, fomenting coups and conflict, and undermining the rule of law.

Other jurisdictions, notably Chile and Brazil, have been held up as making strides in improving the rule of law. Brazil, for example, has introduced the *ficha limpa* (“clean slate”) law, which prevents people convicted of crimes from running for public office. **Jane Croft**



**50 IDEAS** RULE OF LAW

This did not quite succeed in cementing capitalism into the hearts of the British public, but it certainly created a culture that respected the primacy of market forces in many areas previously thought to be the preserve of government.

Starting in 1979 with the sale of a tranche of BP, the oil producer, one after another of the commanding heights of the economy was sold. Telecoms, gas, electricity, the railways, the national airline, steelmaking, water and sewerage provision, coal mining and shipbuilding were all to follow.

This became a global phenomenon after the fall of the Berlin Wall in 1989 and the end of Soviet communism. Privatisation was seen as an essential tool

The rule of law is seen as the foundation of a civilised society. It is crucial in fostering an environment in which business can flourish.

In a recent speech on litigation funding Lord Neuberger, president of the UK's Supreme Court, emphasised the importance of the rule of law: “Investors need to know that the political elite will not expropriate their profits or their businesses at will.

“Individuals and business have to be able to enforce contracts, to protect their intellectual property and to obtain effective redress not merely against other individuals and business but also against the state.”

As Adam Smith put it in his 1776 *Inquiry into the Nature and Causes of*

# 50 IDEAS GLOBALISATION

“  
THE POOR ARE NO  
LONGER SEEN JUST AS  
PASSIVE AID RECIPIENTS  
”

## 50 IDEAS GLOBALISATION AND TRADE BLOCS

The word “globalisation” became popular in the 1980s because it seemed to capture the new world in which business was operating. Since then it is not just stock markets that have gone global. The economist Philippe Legrain has calculated that by 2010 China exported as much in six hours as it had in the whole of 1978.

That year is significant because it marked the start of the modern era of globalisation, with Deng Xiaoping’s reform and opening of the Chinese economy, beginning in December 1978.

Over the next 20 years, other countries took significant steps to facilitate globalisation and new regional trade blocs were formed.

The UK, under prime minister Margaret Thatcher, abolished exchange controls, laying the foundation for the rise of London as the pre-eminent global financial centre. The EU created a single market. The US, Canada and Mexico created the North American Free Trade Agreement, and Latin American countries such as Brazil and Argentina embraced the “Washington consensus” of market-driven reforms.

In 1989, the Berlin Wall came down, meaning the communist half of Europe could embrace global capitalism. And in 1991, India turned its back on inward-looking economic policies and embraced liberal economic reforms. In 1995, the World Trade Organiza-

tion was formed to police the rapidly expanding global trade system.

But it was international business that gave globalisation meaning. Over the past 30 years, international trade has grown about twice as fast as the global economy. China has emerged as a new hub, both as a market and a maker. Yet one of the most striking facets of globalisation is the sheer complexity and geographical extent of global supply chains.

The next step will be the expansion of south-south trade and the rise of multinationals from former emerging markets, such as Brazil, India and China itself. Globalisation is becoming truly global. **Gideon Rachman**

## 50 IDEAS SELLING TO THE NEXT BILLION CUSTOMERS

Until recently, the world’s poor were seen as people in need of largesse, whether from the state, large philanthropic organisations or small community groups. Today, the poor are no longer seen just as passive aid recipients but as a new consumer class willing to pay for goods and services – if these products are packaged, and priced appropriately.

The radical notion that selling to the poor can be profitable – and can help to alleviate poverty – was most actively propagated by the late CK Prahalad, an Indian-born professor of corporate strategy at the University of Michigan.

His 2006 book *The Fortune at the Bottom of the Pyramid* argued that treating the 4bn people in the world living on less than \$2.50 a day as potential consumers – and developing business models to serve their needs – was “at the heart of the solution to poverty”.

Even before that, some individuals and companies had seen the potential. In the 1980s, Muhammad Yunus, a Bangladeshi economist, founded his pioneering Grameen Bank, which provided small loans to poor rural women at interest rates higher than commercial banks – from which the women

could not borrow anyway – but lower than the local money-lenders.

In India, Hindustan Lever, an arm of consumer goods giant Unilever, in the 1990s started selling sachets of shampoo, tea and other consumer basics for one rupee – which even the poorest Indian could afford.

In Brazil, Casas Bahia became the country’s largest retailer by allowing cash-strapped working-class consumers to pay for household items in small instalments.

Philanthropic organisations have also been affected by the new mantra of market-based solutions to intractable problems. Charities such as the Michael & Susan Dell Foundation are putting their resources into social businesses that provide services such as health and educational support or even clean drinking water, through businesses that charge small user fees.

Of course, debate still rages over the ethics of profiting from the poor. Most mainstream companies see little problem with earning returns for shareholders if they can succeed in cracking the bottom of the pyramid market. Other companies with a stronger social mission tend to follow Yunus’s belief that profits should be ploughed back into the business to allow it to expand and serve more customers. **Amy Kazmin**

## 50 IDEAS DEREGULATION

Proponents of deregulation have long argued that loosening government’s hold over industry enhances competition and efficiency, while burdensome regulations overwhelm companies in red tape and ultimately stymie growth.

The chief arguments against deregulation are that consumers can pay the price when companies or whole industries operate without independent oversight, opening the door to environmental and safety problems and even financial crises. The philosophy behind deregulation was most clearly articu-

**Up and running: micro-finance schemes in India have helped to get small businesses off the ground**



Looking up:  
Brazil is forecast  
for economic  
stardom but  
growth has not  
been consistent

lated by economist Milton Friedman, who in the 1960s called for the scope of government to be “limited”.

The deregulation of US industry began in earnest under the 1980s administration of Ronald Reagan, when relaxation of rules governing transportation led to vast changes in government’s oversight of banks, telecommunications, energy and the media over the following decades.

Deregulation, whether at the hands of Reagan or Margaret Thatcher in the UK, who oversaw radical financial reform, is seen as a conservative idea.

But in the US it was Bill Clinton, the Democratic president in the 1990s, who embarked on one of the most significant regulatory changes in a generation, and one that is still debated today.

The reversal of the Depression-era banking rule known as the Glass-Steagall Act, which forbade the combination of investment and commercial banks, was supposed to make Wall Street banks more competitive and relevant. And it did.

This deregulatory push was championed by Alan Greenspan, the then US Federal Reserve chairman, and Robert Rubin, Clinton’s Treasury secretary. It allowed banks to merge, grow and be more complex and highly leveraged.

Today, the decision to do away with the 1930s rule is seen as a contributor to the 2008 financial crisis, though not necessarily to its immediate causes, such as the boom in subprime lending.

Just how far has public opinion shifted on the repeal of Glass-Steagall? Last year a champion of the 1990s reform, Sandy Weill, the former Citibank chief executive, created waves when he disavowed the change in structure. “What we should probably do is... have banks do something that’s not going to risk the taxpayer dollars, that’s not too big to fail.”

Today even some Republicans challenge the existence of banks that are so big that they pose a risk to shareholders, because the US economy could not afford to see them fail and therefore would have to bail them out in another crisis. **Stephanie Kirchgaessner**

50  
IDEAS

EMERGENT  
ECONOMIES AND  
URBANISATION

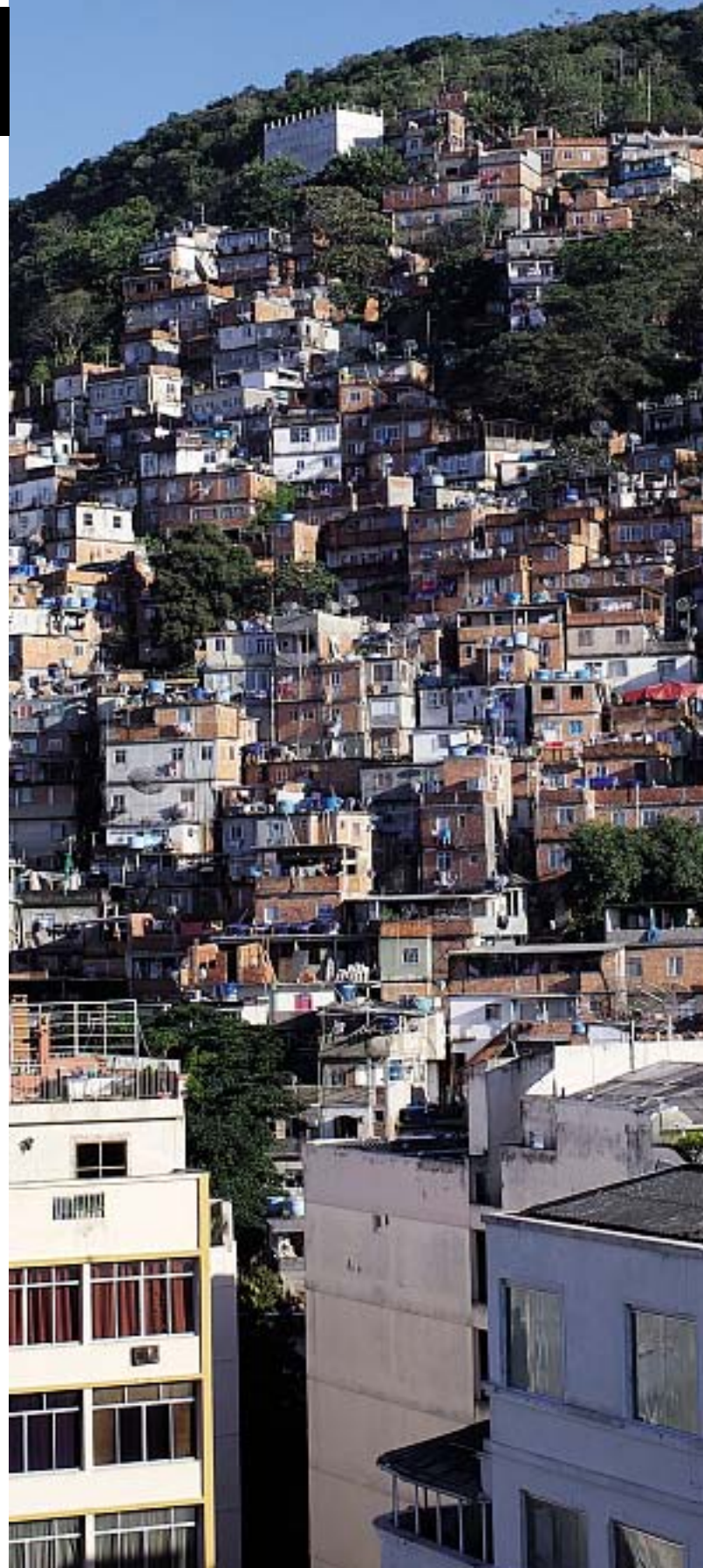
The rise of the emerging markets has profoundly changed the global economy over the past 20 years. Led by China, emerging nations have increased their share of world output from 37 per cent in 2000 to more than 50 per cent; their role in trade from 20 per cent to nearly 40 per cent, and their share of global stock market capitalisation from less than 5 per cent to 15 per cent.

This trend has both fed off and stimulated another world-changing trend – urbanisation. Half of the world’s population now lives in cities, with increasing industrialisation raising the pace to take that figure to an expected 70 per cent by 2030. Last year, the emerging economies grew at an average 5.1 per cent; 7.8 per cent in China’s case. The developed world managed just 1.2 per cent. For 2013, the International Monetary Fund expects 5.9 per cent for emerging states, against 1.2 per cent for the rich countries.

China’s Huawei and ZTE rank among the world’s top five telecoms infrastructure manufacturers. Brazilian-led Anheuser-Busch InBev and South Africa’s SABMiller rank among the world’s top five brewers. Mexico’s Grupo Bimbo is the world’s largest baker.

China, which in 2010 overtook Japan as the world’s second-largest economy by GDP, is forecast to replace the US as number one in the next 15 years or so. By 2050, the top five are likely to be China, India, the US, Brazil and Russia.

However, Malaysia, Singapore, South Korea, Taiwan, Thailand and Hong Kong are the only six emerging economies to have maintained annual GDP growth rates of 5 per cent or more for four decades. That said, in 2013 growth in emerging markets is more diverse than it ever has been, with new countries coming to the fore as others slow down. The developed world, dominant since the industrial revolution two centuries ago, is giving way to a new order. **Stefan Wagstyl**



# 50 IDEAS GLOBALISATION

“  
THOSE WHO SPEAK  
ENGLISH CAN EARN  
SIGNIFICANTLY MORE  
”

## 50 IDEAS EDUCATION EXPANSION

The stunning expansion of higher education constitutes one of the biggest changes to the world in the past 100 or so years. In 1900, there were only 500,000 students in the world; today, the figure is 100m. From less than 1 per cent of school-leavers, the ratio has jumped to one in five.

While the level of higher education, and its quality, is not the same everywhere, the surge has happened across the world. One must look as far afield as Afghanistan under the Taliban to find a country that has significantly shrunk its higher education system in recent decades.

There has long been resistance among business leaders to the expansion of education. In 1899 in the US, the president of Stanford University felt obliged to dispel the myth that “education is of no value to a businessman”.

There are concerns about whether labour markets can swallow all of these graduates, and about whether degree requirements for relatively lowly jobs will inhibit social mobility.

But there is little doubt that innovation in developed countries is fuelled by the massive increase in the basic education of its citizens. Indeed, the west’s universities attract great innovators from the developing world. This has drastic effects on society and economies.

As Evan Schofer and John Meyer, sociologists at Stanford, argue: “The modern world is knit together in an elite power structure of people more schooled in a cosmopolitan world culture than in their own local one, and linked more tightly to each other than to their own populations.”

The concentration of excellent universities in the developed world means the best and brightest of the emerging world aspire to leave their homelands for a spell – and many do not return. The expansion has created effects that support existing elites and successful countries.

Change may be coming, however. Online courses tend to be a little flimsy and lack the community experience of college life, but they are growing increasingly sophisticated. Within the next 20 years it may be possible to get the full university experience at home.

Harvard, Oxford and Cambridge will never be troubled by the rise of online higher education. But if the quality and prestige of online courses start to catch up with those of lesser universities, the expansion of the past century may have nothing on growth in the next one. **Chris Cook**



## 50 IDEAS ENGLISH AS LINGUA FRANCA

What do Airbus, Nokia and Rwanda have in common? They all regard English as their preferred language. As a European aircraft manufacturer with French, German, British and Spanish roots, Airbus has always used English as its common language. Nokia, the mobile phone maker based in Finland, uses the language as its gateway to the world. And Rwanda has adopted English as an official language and promotes its use in its education system.

There have been languages before that have been widely spoken. In his book *The Last Lingua Franca*, Nicholas Ostler writes that in 100AD a traveller could go from Spain to the Hindu Kush speaking Greek all the way. But no language has ever been spoken in as many places as English is today.

When a Brazilian meets a German, they will almost certainly speak to each other in English. In business conferences from Berlin to São Paulo, it is taken for granted that speeches will be in English. In many sectors, such as banking and management consultancy, it would be impossible to rise to the top without fluent English.

Such is English’s importance in business that those who speak it can earn significantly more. A British Council

report, *The Benefits of the English Language for Individuals and Societies: Quantitative Indicators from Cameroon, Nigeria, Rwanda, Bangladesh and Pakistan*, found English speakers in those countries earned 25 per cent more than colleagues who didn’t speak the language. In Rwanda, in some jobs the difference was 181 per cent.

Does this mean native English speakers can expect to get the best jobs? Not necessarily. First, they are more likely to be monoglot – to speak no languages other than English. Non-native English-speaking business high-flyers can manage in both English and their own language, which is helpful in dealing with local customers.

Second, studies have shown international business gatherings in English often proceed more smoothly when there are no native English speakers around. The native English speakers often speak too quickly and use metaphors the others do not understand. Jean-Paul Nerrière, a French former IBM executive who observed this at many meetings, promoted what he called Globish, composed of 1,500 English words he said were perfectly adequate for business purposes.

But could English be supplanted by another global business language, such as Mandarin? It could happen, but given the time and effort learning a new language requires, it is difficult to see English being supplanted for at least several decades. **Michael Skapinker**

PHOTO: EYEVINE

# HERE'S YOUR CHANGE.



## Turning around a \$30+ billion grocery retailer. From front to back.

Trapped in a classic “doom loop” with poor performance preventing much-needed investments, a grocery retailer was locked in a downward spiral.

Working together with the new ambitious management, we helped make the turnaround possible. The solution was an insight-driven, hands-on approach that enabled an improved customer experience and greatly increased efficiencies.

The results of the mobilization went beyond what customers could see and feel in the stores. Cost reductions were 30–40% above initial estimates; the firm’s EBIT grew by more than 25% annually; and its stock price increased 70% since BCG involvement. Absenteeism and staff turnover were also reduced, while the boost to morale created a winning culture.

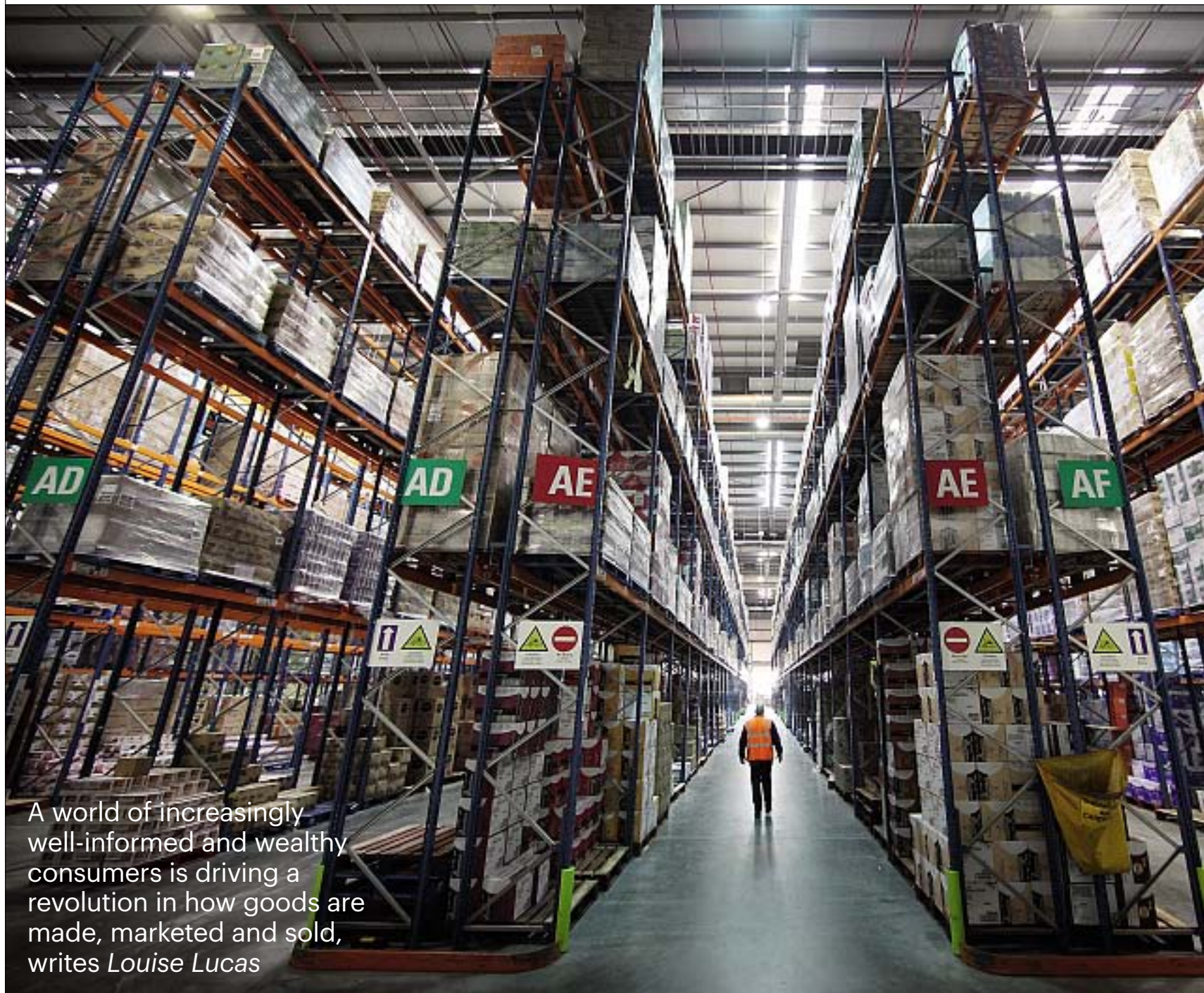
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# Consumers



A world of increasingly well-informed and wealthy consumers is driving a revolution in how goods are made, marketed and sold, writes *Louise Lucas*



“  
 CONSUMERS HAVE GREATER  
 LEVERAGE IN THE FORM OF PRICE  
 COMPARISONS IN A WORLD  
 WHERE AUSTERITY LOOMS LARGE  
 ”



**F**rom the immediate postwar era, when shortages, rationing and black-market dealings defined the consciousness in much of Europe, to the freshly minted middle classes proliferating across Asia, Latin America and Africa, the ability to see, want and buy is an integral part of the human psyche. Manufacturers of goods – both those we need and those we could comfortably do without – have monetised this with abandon.

Thus, more than a century after the first Ford motor car rolled off the assembly line, there are now more than 1bn cars on the planet. In China alone, 120m passenger cars ply the roads; this in a country whose roads not two decades ago were dominated by bicycles.

However, the capriciousness of consumers, and the size of their wallets, makes this two-way traffic. In 2011, for the first time since the second world war, Italians bought more bikes than cars – a big turnaround for the country that spawned marques such as Fiat, Ferrari and Lamborghini and where car ownership became a symbol of the 1960s economic miracle.

Or take fashion. The desire for cheap but chic clothes has, over the past two decades or so, resulted in disposable fashion and the rise of stores selling of-the-moment kit that, with T-shirts going for \$5-\$10, are clamouring for attention on the world's high streets.

Some, such as Zara of Spain, have new stock arriving on a weekly basis, enticing customers to come in and update their looks each weekend. A wealth of supply chains make that easier: switching suppliers for western European branches from, say, China to the Czech Republic makes just-in-time shopping easy. If bright orange is sud-

denly in, tangerine bikinis can be on the hangers within days.

The luxury sector does not move quite as fast but is no less covetable. That market, whether for yachts, frocks or safaris, is set to hit \$1.5tn this year, roughly matching the entire economic output of Spain or Australia, according to Boston Consulting Group.

Luxury goods and services have the merit of being about more than keeping you warm or – in the case of a \$1,000 bottle of aged Scotch whisky, sating a thirst. These are status symbols that, in the natural order of things, go with accumulating wealth.

This is seen in the rapidly growing sales of luxury goods in the likes of China, which accounts for 10 per cent of the global market. Chinese travelling overseas make a further 12 per cent of purchases, according to Altgamma, the Italian luxury industry association.

Manufacturers have played to this, carefully segmenting their product ranges. In retail too, supermarkets might offer basic ready meals alongside middle-of-the-road versions and pricier, hopefully nicer, top-of-the-range ones. And designers have diffusion or “little sister” lines, or offerings of \$60 perfumes to those who are unable to splash out \$2,000 on a bag, for example.

Distillers have also perfected the art, selling vintage whiskies in crystal bottles, monogrammed if desired. Diageo, the world's biggest distiller and the name behind Johnnie Walker Scotch (bottles from £18 to £100,000, for the Diamond Jubilee limited edition), has perfected this art, serving some of its priciest concoctions in the Johnnie Walker House in Beijing and Shanghai.

These clubhouses, redolent of decadent 1920s Shanghai, illustrate another way manufacturers and retailers are exerting their pull on consumers' purse

strings. Membership of clubs, whether exclusive drinking houses or supermarkets' everyone-qualifies loyalty schemes, allows purveyors of goods to track our habits and learn our tastes, thus encouraging us to buy more.

Supermarket loyalty cards prove the point. Buying nappies, for example, will flag you up as a new parent and thus a potential customer for infant rice cereal, rattles or soft toothbrushes for barely existent baby teeth.

Again, power works both ways. Along with more money, consumers have greater leverage in the form of price comparison websites and smartphone apps in a world where austerity looms large.

It is perhaps fitting that people power, which has been a powerful agent for change in the political dynasties of the Philippines and swaths of the Arab world, is alive and kicking in the shopping aisles of the west.

**50 BRANDS**  
**IDEAS**

“In a single day, how many really non-signifying fields do we cross?” Roland Barthes, the French semiotician, parlayed everything from Greta Garbo's face to laundry soap through his prism. But brands, those all-important names we covet, consume and then consume some more, remain among modern society's most prevalent signifiers.

Brands are everywhere: shouting from the television (through adverts and product placements), billboards and the moment you enter a shop. Not for nothing is an early signifier in *The Great Gatsby*, F Scott Fitzgerald's novel and now a Baz Luhrmann-directed film, the enormous yellow spectacles advertising

# 50 IDEAS CONSUMERS

“  
ONLINE MARKETPLACES HAVE  
PRODUCED GREAT ADVANCES  
IN CONSUMERS' ABILITY TO  
RESEARCH AND PRICE-CHECK  
”

the all-seeing optician TJ Eckleburg.

Branding is part of our culture as well as business. There is even a museum of brands in London, housing the collection of more than 12,000 labels, packages and posters of “consumer historian” Robert Opie.

A brand, says Don Williams, chief creative officer of pi global, the branding consultancy, is “a distinctive entity which communicates its values, what it stands for, what it does, how it’s different, what it looks like, how it behaves... nations are brands, religions are brands, actually... WE are brands”.

Brands, their purveyors believe, build loyalty and ensure we stick with Dove shampoo, Toyota cars or Apple iPhones, for example. Manufacturers of consumer goods, such as Procter & Gamble of the US and Anglo-Dutch Unilever, spend 10-15 per cent of sales on advertising and promotion – much of this brand building.

Monetising that brand loyalty is ever more important for businesses, whether it be supermarket loyalty cards or licensing marques – those remote-controlled Ferrari toy cars or Samsung on the shirts of Chelsea footballers.

Some companies are taking this to new levels. Ferrari and Harley-Davidson are among those making a decent chunk of their revenues from branded goods alongside their cars and motorbikes, for instance. Deluxe designers have perfumes – usually licensed out – from Gucci’s Guilty to Prada’s Candy.

Office addresses, or rather the buildings that house them, are increasingly brands in their own right – London’s The Shard or Kuala Lumpur’s Petronas Towers, for instance.

“The world revolves around brands; unless you’re standing naked in a field, you’re surrounded by brands and brand identities,” says Williams.

Perhaps subconsciously – for this is how signifiers work – he is echoing Barthes. “Here I am, before the sea; it is true that it bears no message. But on the beach, what material for semiology! Flags, slogans, signals, signboards, clothes, suntan even, which are so many messages to me.” **Louise Lucas**

## 50 ONLINE MARKETPLACE/ ECOMMERCE IDEAS

The first product sold on eBay, the auction website, was a broken laser pointer. In September 1995 its founder, Pierre Omidyar, posted it for sale on a website he first named AuctionWeb. The pointer sold for \$14.83. When Omidyar asked whether the buyer understood that the pointer did not work, he was reportedly told: “I’m a collector of broken laser pointers.”

Two months earlier Jeff Bezos had opened Amazon.com, but Omidyar was more interested in the business of helping others sell online – by creating an open-access marketplace where they could be matched with buyers.

In part he used old ideas: the auction and the outdoor marketplace. What was new about the eBay online flea market was that it tested whether strangers could build enough trust over the internet to trade with each other. It sounded unlikely to many at the time. Today, it seems ludicrous to doubt.

Trust was built by sellers who offered product photos, contact phone numbers and shipping details. And by payment systems, public scoreboards for customer service and policing mechanisms. Now, online marketplaces are a fixture of global retail.

No bazaar is without rogues and counterfeits. But online marketplaces have produced great advances in consumers’ ability to research, price-check and buy a wider range of products.

Even Amazon got in on the act. It wants to offer the world’s largest selection of merchandise, but only wants

to hold the more popular goods. In 2000, it opened its own marketplace – and so-called third-party sellers now account for 40 per cent of the sales volume on its website.

Many sellers are ordinary folk clearing out household junk. Online marketplaces give them an easy way to turn that into cash. In an era of economic volatility and environmental stress, that is an underappreciated form of recycling. **Barney Jopson**

## 50 POWERFUL CONSUMERS IDEAS

From the ability to post product reviews on social media sites to comparing the best prices on smartphones while in a shop, consumers have never had so much power.

While in the past it was retailers who decided what customers wanted to buy and then put the goods in shops, today consumers hold the upper hand.

Much of this has been driven by the ability to buy online. According to retail research group Verdict, UK online sales this year are set to account for £1 of every £8. Internet sales are also powering ahead in the US where, according to Bain & Company, the consultancy, online will account for just under 12 per cent of total sales by 2015.

Some retail analysts suggest that with the rise of tablet computers and smartphones a second internet boom has taken place, as consumers can shop online more easily and frequently. Conlumino, the retail consultancy, says mobile accounted for 10.9 per cent of UK online retail sales in 2012.

Smartphones are also enabling consumers to check prices online. They can be in one store but checking the price of a product in a competitor’s shop. This takes away from the retailer one of the traditional givens – that if a consumer was in your store at least you had some influence over them. Not any more.

**For followers of fashion: online shopping now accounts for £1 of every £8 spent in the UK**





This is leading to the concept of showrooming, whereby shoppers go to a shop to test or examine a product before buying elsewhere, usually online. According to a survey from TNS, part of Kantar, the consumer research group, 33 per cent of people worldwide admit to showrooming.

When it comes to the nuances of showrooming, some 43 per cent of people use their mobile to read product reviews while in store, but 31 per cent use their mobiles to compare prices, according to TNS. Some 14 per cent use their phones to check availability in other stores, while 14 per cent examine whether it is easier to order online.

In the US, some shoe retailers, frustrated at consumers who try on shoes for fit in physical stores but buy them cheaper online, have dubbed these shoppers “fit-lifters”. But TNS says stores can still engage shoppers – and nudge them to the tills – even when they are surfing on their smartphones in the shops. It found that 38 per cent of people are interested in redeeming coupons on their mobile phones, while 30 per cent would like to receive coupons when they walk past a product.

David Suddens, chief executive of R Griggs Group, the maker of Dr Martens footwear, says with the rise of multi-channel, it is the way of the world for retailers. “We have to let consumers do what they will do,” he says.

**Andrea Felsted**

**Try before you buy: so-called ‘fit-lifters’ will buy online after visiting a retail store**

## 50 CUSTOMER SEGMENTATION IDEAS

Segmenting customers has long been a stock-in-trade for marketing people. But an idea that changed the entire dynamics came in 1995, when Tesco, the UK’s biggest retailer, launched the Clubcard, a customer loyalty scheme that gave it a mass of data to mine about how people shop.

Clubcard was developed by Terry Leahy, a marketing man by background who was to become Tesco chief executive in 1997. The scheme could not only analyse consumer habits but also spot gaps in Tesco’s offerings.

A similar approach has been adopted around the world; in the US by, for example, Kroger, the supermarket chain. Meanwhile, in the intensely competitive UK supermarket sector, Tesco’s rival J Sainsbury uses the Nectar loyalty programme.

In a market where shoppers are bombarded by vouchers and coupons, the loyalty schemes help retailers tailor offers to their customers.

Janet Smith, Tesco’s head of group loyalty, has described untargeted offers, such as coupons printed in newspapers, as “bland”. In contrast, offers using Clubcard data give “customers discounts on the things they want to buy”.

Justin King, Sainsbury chief executive, has said: “If you target [money-off vouchers], you will give customers coupons they value... It works very powerfully.” But a new frontier in segmentation is opening up: the information provided by online searches, or the products shoppers buy via the internet.

Online searches can be used to build a detailed profile of a customer. For example, if a shopper is of a particular age or gender, he or she may need to buy certain products. This data could then be used to send consumers specific offers or promotions.

The Office of Fair Trading, the UK consumer protection watchdog, is looking at whether online retailers are personalising prices to customers, based on factors such as their browsing history.

Personalised pricing takes customer segmentation a stage further. The theory is that retailers may not offer just discounts and promotions, but also adjust the prices they offer to a website visitor based on the visitor’s past online behaviour or location.

The OFT first looked at this issue in 2010 but found no evidence of this type of personalised pricing in the UK, although it recognised the area was still evolving. Consequently, it wants to understand the changes that have taken place since the 2010 study, to ensure regulatory controls keep pace with technology and business strategy.

**Andrea Felsted**

# Energy

“

THE SURGE IN SHALE PRODUCTION HAS LED TO A MANUFACTURING RENAISSANCE IN THE US

”

Renewables are today's growth story, but fossil fuels still dominate, writes *Guy Chazan*



50  
IDEAS

CHANGING SOURCES OF ENERGY

Ever since the industrial revolution the world has relied on fossil fuels for energy. Coal, oil and natural gas have been the mainstay of our economies, powering industries, fuelling our transport and heating our homes.

But a new sight is emerging in the western industrial landscape: wind turbines and solar panels. Renewables' share of the world's energy mix is increasing and challenging the hegemony of fossil fuels.

The rise of solar has been particularly striking. Ten years ago, installed global photovoltaic capacity was about 2.8GW. By last year, that had grown to 102GW – enough to meet the energy needs of more than 30m European homes. Installed wind capacity has grown from 39GW to 282GW over the same period.

This is not the first shift in energy use. In the 19th century, wood gave way

to coal as industrialisation gathered pace, and the power industry switched from oil to natural gas after the oil price shocks of the 1970s. But the move to renewables is the only big power change driven largely by government policy.

The reason for that state support is climate change. Low-carbon technologies are seen as key to slowing global warming. That gives countries an incentive to support renewable energy, even though it is much harder to harvest and costlier than electricity generated from fossil fuels. Though some subsidies have been withdrawn since the financial crisis of 2008, in countries such as Germany they are still substantial.

Germany has become a renewables juggernaut. It hopes to generate at least 35 per cent of its electricity from green sources by 2020. But last year renewable power generators earned about €20bn for electricity that was worth much less on the wholesale market – and consumers paid for the difference.

The growth of renewables is just part of a broader narrative of growing diversity in energy supplies. Nuclear

**Sunny outlook: solar power has grown almost 40-fold over the past decade**

power has emerged from the shadow of Chernobyl to stage a surprising comeback – one that was almost derailed by Japan's 2011 Fukushima disaster but is now back on track. Though countries including Germany have turned their backs on nuclear, others, including the UK, see it as a vital component of the energy mix. China alone has 28 reactors under construction.

Yet despite the inroads made by wind, solar, biofuels and nuclear, energy continues to be dominated by fossil fuels. ExxonMobil, the oil major, says coal, oil and gas will account for 80 per cent of the energy mix in 2040 – little different from now. That is partly a result of growing confidence about the outlook for oil and gas supplies.

Driving this is the shale revolution. Techniques such as horizontal drilling and hydraulic fracturing (fracking) – in which water, sand and chemicals are injected into shale rock to release the oil and gas trapped inside – have opened up vast energy reserves previously thought uneconomic.

The surge in shale production has pushed down US natural gas prices and prompted a manufacturing renaissance in the US as industries such as petrochemicals take advantage of cheaper gas. The boom has been replicated in the oil sector, as crude production soars in places such as North Dakota's Bakken Shale. The US could be almost self-sufficient in energy by 2035, overtaking Saudi Arabia and Russia to become the world's largest oil producer by the second half of this decade, according to the International Energy Agency.

The race is on to emulate the US, with Ukraine, China and Argentina all investing heavily to develop their unconventional resources. And with the oil majors also investing more and more to find and extract crude oil and gas, it is too soon to write off fossil fuels.

PHOTO: GETTY

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# Aviation



Airlines have changed the world – but profits remain firmly earthbound. By *Kevin Done*



AIR TRAVEL

So what is it that the airlines don't get about air travel? Seven, going on eight decades of jet-propelled air transport have supported the creation of the global village. Flying connects. It makes global business a reality.

About 3bn passengers a year take to the world's airways for business or pleasure. Virtual meetings and business contacts, virtual friendships and relationships may all be possible, but they clearly cannot substitute for the real thing.

It can be a hassle getting to and through the airport, and the in-flight experience may be less than glamorous depending on which end of the aircraft you can afford, but modern life is hard to imagine without air travel.

More than a third of world trade, by value, travels by air. Whether it is French beans from Kenya or asparagus from Peru, air transport allows the incredible range of fresh produce available on the world's supermarket shelves regardless of the season. Critical, time-sensitive deliveries are possible only by air.

Debate may rage about the iniquities of food miles, the environmental impact of air travel, the scourge or delights of modern tourism – itself a lifeline for many emerging economies – but we are hooked. Air transport is part of the fabric of our lives.

It is a key factor shaping the modern world, and yet the airlines themselves – uniquely in the aviation supply chain – have still not worked out how to make any money from all this activity.

Warren Buffett, the legendary US investor and a leading sceptic about investing in airlines, famously observed that if a far-sighted capitalist had been present in Kitty Hawk in the US in 1903 at the birth of powered flight, he would have done his successors a favour by shooting down Orville Wright. Despite an occasional lapse investing in commercial aviation, Buffett believes airlines are the worst sort of business, growing rapidly, requiring abundant capital to foster the growth, and then earning little or no money. He has, however, been a long-term investor in flight-training services and business jets.

The industry's high fixed costs make airlines very vulnerable to economic fluctuations, its workers tend to be organised in strong trades unions and it has been forced into budget pricing for short-haul travel.

The sector has achieved a measly 0.1 per cent average net profit margin in the past 40 years and has failed to cover its cost of capital since the advent of the jet age. It faces key monopoly suppliers in the shape of airports and air traffic control providers and an established duopoly – Boeing and Airbus – as makers of new aircraft. Rival aircraft builders in Canada, China and Russia are emerging only very slowly.

The industry remains highly fragmented. Consolidation is occurring on a national basis, as in the US in the past couple of years, and on a regional basis within the European Union, but mergers and acquisitions on a global scale are still prevented by the strait-jacket of international regulation dating back to 1944.

For long years airlines have specialised in shooting themselves in the

**High numbers:**  
3bn passengers  
each year and  
more than a  
third of world  
trade by value  
travel by air

foot by failing to control capacity in a desperate chase after market share – although the long and wearying years of weakness in the global economy appear finally to have instilled some discipline.

The threats to the viability of air travel have at times appeared positively biblical in scope. Giovanni Bisignani, former chief executive of the International Air Transport Association, has talked of the four horsemen of the apocalypse bearing down on the industry, from war and terrorism to pestilence (swine flu and Sars) and recession, only for a fifth rider to appear in the shape of a soaring oil price.

But to be fair, the airlines have not been idle. They have done much to restructure. In 2002 the industry could barely break even at around \$20 a barrel of oil. Now it can break even at \$110. That is enormous progress.

Profitable or not, most forecasts indicate an inexorable continuing growth in air travel. Short-haul flights increasingly take place with low-cost carriers. In the long-haul segment, more and more travel is routed via the ever-stronger Gulf hubs.

And, one day, air travel may again allow passage through an airport leaving one's hair shampoo, deodorants and toothpaste packed in the carry-on bag.

“VIRTUAL MEETINGS, BUSINESS CONTACTS AND RELATIONSHIPS MAY ALL BE POSSIBLE BUT THEY ARE NO SUBSTITUTE”

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# Banking and finance

The quest for financial innovation has seen the introduction of the now-indispensable ATM, but also gave birth to synthetic debt instruments which a few years later were associated with the global financial crisis, says *Patrick Jenkins*

**I**f any self-respecting investment bankers had been asked six years ago to name the greatest financial innovation of recent times, they would probably not have hesitated to name the collateralised debt obligation – a clever structure based on thousands of chopped-up mortgages and mortgage-backed securities.

The demand for the high, supposedly safe, investment returns that came with CDOs allowed them to grow stratospherically in the decade up to 2007.

Today, even the bankers who made their millions in that business are coy about letting the discredited three-letter acronym pass their lips. The popularity of CDOs in turn fuelled growth in the underlying loans, many of them ultimately concentrated in high-risk subprime mortgages to poor Americans who were soon struggling to keep up repayments. As anyone with even a passing interest in finance will know, this was how the seeds of the financial crisis were sown. Simple securitisation, repackaging loans into new bonds, is edging back into fashion as fund managers seek investments that will generate a little income amid stubbornly low interest rates. But the CDO – and the more abstruse derivatives it generated – is certainly not high on many people's best-inventions list any more.

There is even some recognition among investment bankers that Paul Volcker, the US policymaker and former Federal Reserve governor, might have had a point when he talked about the simple cash machine, or ATM. "The most important financial innovation that I have seen the past 20 years is the automatic teller machine," he said at the height of the financial crisis in 2009. "That really helps people and prevents visits to the bank and it is a real convenience. How many other innovations can

you tell me of that have been as important to the individual as the ATM?"

With investment banking so unfashionable these days, other retail innovations are also popular contenders for the greatest inventions awards. Online banking via a smartphone, for example, is now taken for granted by millions. But it is particularly powerful in emerging markets, creating a virtual infrastructure for a fast, efficient spread of credit and broader financial services. That is especially true in Africa, where technology has allowed banks and their customers to leapfrog the expensive and time-consuming process of building up vast branch networks to support growth.

For many, the best big-picture innovation of the last millennium was the creation of the capital market. Fourteenth-century Venice and 16th-century Belgium can both lay claim to the concept. But whatever the roots, there could scarcely be a more apposite touchstone, especially in Europe, as the region struggles to escape the eurozone financial crisis and rebuild economic growth.

The region's politicians and central bankers alike are desperate to move the financing of the European economy into line with that of the US, where about three-quarters of company funding comes not from banks but from capital markets, rather than the meagre quarter that Europe can boast. The crisis taught European leaders a powerful lesson about the vulnerability of an economy that relies on bank finance when banks are themselves so vulnerable to failure.

It is far from clear that this shift will happen, whatever the political will. Who knows? Perhaps quantitative easing, the Basel III rulebook on bank capital and the European Central Bank's longer-term refinancing operation – all innovative responses to the crisis – will one day be recognised as the best financial inventions of recent years.

# 50 IDEAS BANKING AND FINANCE



**Fair share:**  
consumers were  
fast to boycott  
companies  
accused of  
dodging tax

## 50 IDEAS

### TAX OPTIMISATION

Towards the end of the 20th century, as companies sharpened their focus on shareholder value, they stopped seeing tax as a cost of doing business and started to see their tax departments as potential profit centres that could boost their bottom line.

The result was an explosion of aggressive tax planning in which companies used artificial schemes and shelters. When tax authorities fought back, multinationals pursued a different line of attack, exploiting the growing tax competition between countries.

Companies put divisions, activities and even head offices in low-tax countries. As companies became more international, they felt less bound by national loyalties.

Tax-efficient structures allowing profits to be shifted to low-tax countries became the norm for many large multinationals.

Many scrambled to centralise their “intangible assets” – the intellectual property, brands, trademarks and know-how that account for 80 per cent of the value of big companies – in low-tax countries such as Singapore, Switzerland and the Irish Republic. As royalty payments soared – up from \$2.8bn to \$180bn globally between 1970 and 2009 – more taxable profits flowed out of high-tax regimes.

Governments struggled to keep up. International tax rules designed for an era that pre-dated the global, internet-enabled economy did little to stop tens of billions of earnings falling through the cracks.

The backlash was fierce. The budget crisis that followed the financial crisis focused attention on businesses not paying their “fair share”.

Austerity sharpened the public’s anger. In some countries, companies accused of tax-dodging faced intense criticism from politicians, and even consumer boycotts. Development charities blamed corporate tax avoidance for poverty in developing countries.

The changed climate has forced companies to reappraise their approach to tax planning.

There is a growing realisation that an aggressive strategy can damage a business’s reputation.

But multinationals will be reluctant to give up on minimising their corporate tax bills, potentially one of the biggest costs they face.

The tide may turn, but it has not yet done so. **Vanessa Houlder**

## 50 IDEAS

### MODERN CORPORATE FINANCE

The advent of the securitisation market and the high-yield bond market in the 1970s and 1980s changed the face of western capitalism.

Investment bankers grew rich, but the main change was that companies could borrow more freely. This meant they could grow faster, take more risks and hire new people.

PHOTOS: GETTY

“ DELAYED PAYMENT FOR CERTAIN GOODS AND SERVICES WAS MADE POSSIBLE BY WAGES PAID AT REGULAR INTERVALS ”

Everyone was touched by these innovations. Companies had more choice on financing. In the US in particular, borrowing increasingly came from the public markets rather than the banking sector, a model that exists to this day and has been slowly migrating to Europe.

High-yield – or “junk” – bonds are the debt issued by lower-quality companies with a higher chance of defaulting. Securitisation is the packaging up of debts and other income streams into a single marketable product, notionally spreading risk across the financial sector.

In the boom times before the financial crisis, however, these structured products designed to lubricate the wheels of financing became devices to allow investors to add embarrassing levels of risk to their portfolios. A vast acronym soup of instruments emerged that few truly understood.

It was the collateralised debt obligations backed by subprime mortgages in the US that were the final undoing of a banking system that had lost track of what was happening to structured products and who owned them.

High-yield bonds – popularised by American trader Michael Milken in the 1980s to allow highly leveraged and other less creditworthy companies to borrow – do not emerge spotless either.

The decade culminated in scandal with the collapse of a raft of lower-rated issuers, Milken in jail for securities fraud and the Wall Street investment bank he worked for, Drexel Burnham Lambert, in ruins.

But these rough-and-tumble instruments did expand the realm of what was possible.

Some argue the reason why the US is doing better than Europe today is in part because it has more of these complex structured products, so its companies can borrow more liberally and therefore grow faster.

In Europe, the market in asset-backed securities is largely dead, making companies more reliant for financing on the banks – which are themselves stricken. **Michael Stothard**



**Trading places: certain products were specifically designed to spread their risk across the financial sector**

## 50 CONSUMER CREDIT IDEAS

The history of consumer credit is a story of rising living standards, the emergence of an affluent and aspirational middle-class and commercial innovation.

While allowing buyers time to pay has always been a basic tool of commerce, consumer credit in its modern guise of instalment plans, consumer loans and, eventually, the credit card was a byproduct of the Industrial Revolution, a period which heralded a new era in consumerism.

The factory workers who swelled cities such as Manchester, Bristol and New York to make clothing and tableware, and later televisions, refrigerators and cars, became a new breed of consumers as well as producers.

Delayed payment for certain goods and services was made possible by wages paid at regular intervals, even if these remained relatively low.

Meanwhile, consumption became the new creed and credit fuelled the sales of goods, which in turn spurred profitability and economic growth. And that increased consumption helped to raise living standards.

Credit became ever more sophisticated, with American Express and Bank of America launching credit cards in 1958. While demand in the US and Europe has been blunted since the financial crisis, consumer credit is once more in a phase of innovation.

New models such as peer-to-peer lending platforms, which allow individuals to lend to each other and to small businesses, have emerged, with the promise that they are able to provide credit as the biggest banks deleverage.

More controversially, there has been the rise of a crop of payday loan companies, which have come under fire from politicians and consumer groups for the high interest rates they charge.

However, there are two principal

challenges for both new and old providers. First, the jolt of the financial crisis – combined with stagnant wage growth and employment uncertainty – has left consumer spending sluggish and many customers focusing on meeting repayments rather than taking on new debt.

Second, increased regulatory scrutiny after low interest rates and a rapid expansion of bank lending prompted a surge in household debt to unsustainable levels in the years before 2008.

Partly for these reasons, those looking to develop retail loan portfolios are turning to the growing middle-classes of markets such as India, Russia and eastern Europe. Those areas are where the next burst of growth in consumer credit is likely to come from.

**Jennifer Thompson**

## 50 BLACK-SCHOLES AND ALGORITHMS IDEAS

Trading and risk have always been intertwined, with merchants constantly seeking ways to reduce their exposure to unforeseen events. As the Dutch Golden Age of the 17th century began, merchants in Amsterdam and Antwerp began using options – which gave the holder the right to buy or sell a security at a set price – as an insurance. Similar products such as warrants were traded on stocks in Wall Street in the 1920s, but were never “mathematically” priced.

That changed in 1973. Two US academics, Fischer Black and Myron Scholes, backed by a third, Robert Merton, published a paper that contained a model to calculate fair market value for call options. It gave traders a supposedly objective method of comparing option prices.

Two years earlier, US president Richard Nixon had removed the ability to exchange the dollar into gold, ending the international system of fixed exchange rates. Less than two years later, the world would be dealing with inflation triggered by oil price shocks.

# 50 IDEAS BANKING AND FINANCE

The accompanying interest rate volatility meant investors needed to hedge their risk, and led to a demand for more options and other derivatives.

In the following decade, futures and options, at one time used by farmers to lock in the price of physical commodities, increasingly became used for financial products.

Volumes exploded. But the significance of the formula has been hotly debated. Some ask whether it is really possible to calculate the “true” price or value of any object.

The biggest blow came in 1997 with the failure of Long-Term Capital Management, the hedge fund that had Merton and Scholes on its board. The fund had spectacular early returns. But the unexpected Russian sovereign default in 1998 upset its calculations and it needed a bailout from the Federal Reserve after it lost \$4.6bn in a matter of months.

In a 2008 paper, Espen Gaarder Haug and Nassim Nicholas Taleb argued that Black and Scholes only came up with a theoretical argument built on a new way of “deriving” the 1900 formula of Frenchman Louis Bachelier. **Philip Stafford**

## 50 CORPORATE GOVERNANCE IDEAS

Independent directors, quotas for women, chairmen to watch over chief executives... it is striking how much of the time spent talking about companies is spent talking about how they should be governed.

Whenever there is a corporate crisis – whether it is the fraud involving drinks company Guinness in the 1980s, or the collapse of investment bank Lehman Brothers in 2008 – the cry goes up for better oversight by corporate boards.

Corporate governance has been one of the most influential corporate movements of the past 30 years. The overwhelming drive has been to staff corporate boards with independent thinkers who can rein in hubristic chief executives and prevent company directors from succumbing to “groupthink”, the tendency to echo each other’s views while the company pursues a disastrous course. Properly governed boards have also been given the task of keeping chief executive pay under control.

“WHENEVER THERE IS A CORPORATE CRISIS, THE CRY GOES UP FOR BETTER OVERSIGHT BY THE BOARDS”

One of the early attempts at corporate governance reform, the UK’s 1992 Cadbury Report, was followed by many others around the world. There is, however, no unanimity over what constitutes good corporate governance. In the UK, the separation of the chairman and chief executive’s role is seen as an unalloyed good. In the US, powerful chief executives, such as Jamie Dimon, chief executive of JPMorgan Chase, have seen off demands that they split their role with a chairman.

The latest battle on the corporate governance front is for the appointment of women to boards. That women are scandalously under-represented on boards in most countries is undeniable.

But advocates of increased female representation go further. They say women would bring a different way of looking at the world and would prevent companies from making the same old mistakes.

Yet years of reform have failed to prevent repeated examples of company excess, fraud or financial collapse. Looking for more female directors would give companies access to more talent. It is unreasonable to expect women board members to succeed where so many men have failed. **Michael Skapinker**

## 50 SHAREHOLDER VALUE IDEAS

Of all the 50 ideas profiled in this publication, shareholder value enjoys a particular distinction. Jack Welch, former chief executive of General Electric and one-time champion of shareholder value, called it “the dumbest idea in the world”.

Yet it has been one of the most influential – and looks likely to remain so. Shareholder value originally rose to prominence to solve what Adam Smith, the Scottish economist, called the “agency problem” – that managers of a company might follow a course which was detrimental to the company’s owners. Shareholder value was a way



**Jack Welch: the influential former GE chief has said that shareholder value is a result, not a strategy**

of ensuring that managers served the interest of those who employed them rather than their own.

Shareholder value faced two principal objections. The first was that the methods used to enforce it did not seem to work very well. Share options, for example, were meant to ensure that chief executives only did well when the shareholders did. Instead, many critics blamed share options and other incentives for managers manipulating company performance to ensure they did best for themselves. That was what led to Welch’s “dumbest idea” comment in the wake of the financial and banking collapse. “Shareholder value is a result, not a strategy,” he said. “Your main constituencies are your employees, your customers and your products.”

This led directly to the second objection to shareholder value: that it gives

too much primacy to just one group with an interest in the company. What of all the others? The late Sumantra Ghoshal of London Business School argued that employees were far more important to a company’s success than shareholders. Critics of the shareholder value idea argue that many shareholders have little commitment to a company, particularly in an era of high-frequency trading.

However, shareholder value is likely to endure as a powerful idea. First, it gives managers something against which they can be measured. Other managerial responsibilities – to employees, customers or the community – are numerically less precise. Second, many ordinary people rely on companies doing well for their shareholders because their own pensions and investments depend on it. **Michael Skapinker**

PHOTOS: BLOOMBERG, AP



**How the mighty fall: the collapse of Lehman Brothers reignited calls for board oversight**

## 50 IDEAS ENTREPRENEURS VENTURE CAPITAL AND PRIVATE EQUITY

When Harvard professor Georges Doriot and his partners founded American Research and Development Corporation in 1946, raising \$3.5m to back startups, they planted the seed of what is now a \$3.3tn private equity industry, financing everything from entrepreneurs to infrastructure projects and property.

Doriot was the first to create a way to pool capital from institutions such as insurers and endowments to fund financially risky innovations in exchange for a stake in their futures.

The same year, also in the US, John Hay Whitney and his partner Benno Schmidt started JH Whitney & Company, providing money for new companies on the assumption that the failure of most would be compensated for by the great success of a handful.

Before this new breed of investors appeared, entrepreneurs had to turn to wealthy individuals to fund their ideas. Doriot paved the way for the professionalisation and growth of the venture capital and, later, the private equity industries on a grander scale.

As public pension plans, insurers and endowments poured more and more cash into the asset class the industry's impact grew.

Investment firms started targeting bigger, more established companies, using cheap credit to maximise their returns. Leveraged buyouts – which now represent \$1.3tn of total private equity assets – included the \$30bn takeover of RJR Nabisco by Kohlberg Kravis Roberts in 1988. But private equity also became a synonym for cost-cutting, layoffs and break-up. The large levels of debt made some companies vulnerable to downturns. And managers' rising fees have irked investors, while the fortunes they made in a short time combined with their favourable fiscal treatment have led governments to tax them more.

**Anne-Sylvaine Chassany**

# Management

Many management theories, even if influential, become outdated – but the most innovative thinking on how to run organisations recognises the constantly changing nature of business, says *Andrew Hill*

**P**eter Drucker, who did more than most to promote the study of modern management, once pointed out that when Karl Marx's collaborator Friedrich Engels was running a mill in the 19th century, its 300 employees had no managers as such, only "charge hands" who enforced discipline on "proletarians".

As Drucker wrote in *The New Realities* (1989) management's "fundamental task" is to "make people capable of joint performance through common goals, common values, the right structure, and the training and development they need to perform and to respond to change". Management, he continued, explains why "for the first time in human history, we can employ large numbers of knowledgeable, skilled people in productive work".

In other words, "management" has a fair claim to be the most revolutionary business idea of the past 150 years – if only managers could pin it down and apply it.

Harvard Business Review has dubbed the years between 1911 – when Frederick Winslow Taylor published his book *The Principles of Scientific Management* – and 2011 "The Management Century". Taylor's breakthrough was to see that production line productivity could be improved by using "scientific" methods of organisation.

The approach has been criticised for imposing a mechanistic regime on workers in the interests of pure efficiency, but it triggered more research into psychological and sociological ways to make manufacturing more productive.

Plenty of management techniques have helped to improve the ability of managers to fulfil their fundamental task. China-based car manufacturers,

for example, are using the production line efficiency methods pioneered by Japan's Toyota and others.

But the overarching management ideas that have shaped the way in which people run any large organisation – and plenty of small ones – are mostly broader and more changeable.

The FT judges chose leadership, ethics, strategic management and the spread of business educators and advisers for the list of the 50 big business ideas. But we steered clear of singling out individual management theories.

Even successful management theories, such as those espoused by Tom Peters and Robert Waterman in *In Search of Excellence* or by Jim Collins and Jerry Porras in *Built to Last*, tarnish with time, as the companies studied fail to keep up with the latest business trends.

Management writers would love to think that their ideas shape business. Some theories, including those mentioned above, did affect managers' thinking and practice, particularly between 1990 and 2000 as globalisation took hold. But unlike solid inventions that can be installed and put to work until the next upgrade – such as fibre optics, robotics or the microchip – "management" is a concept which users must constantly reshape to meet new organisational challenges.

As Charles Handy, the veteran management thinker, now in his 80s, told the FT in a recent interview: "The most that I can do is to cast [managers'] problems and opportunities in a different light so they see them more clearly. But what they do about it and what the answers are, no, I don't have them. So I'm never going to have three rules for success, or this is the answer to leadership... that's impertinent and bound to be wrong anyway most of the time because... every problem is different."



“

‘MANAGEMENT’ IS A CONCEPT  
WHICH USERS MUST CONSTANTLY  
RESHAPE TO MEET NEW  
ORGANISATIONAL CHALLENGES

”

# 50 IDEAS MANAGEMENT

50  
IDEAS

STRATEGIC  
MANAGEMENT

If management was the broad idea that allowed large companies to be run efficiently, strategic management was the vital refinement that permitted managers and their companies to “compete, win and survive”, to quote Walter Kiechel’s lively account of this revolution in *The Lords of Strategy*.

Michael Porter, the Harvard University academic, is the central figure in defining the concept. The pillars of strategic management are underpinned by his two books, *Competitive Strategy* (1980), which defined the “five basic forces” that determine the state of competition in any industry – customer power, supplier power, the threat of new entrants, substitute products and rivalry between established competitors – and *Competitive Advantage* (1985), which told chief executives how to retain their lead over rivals.

As one of our judges said in selecting “strategic management” for the list: before the development of the concept of strategic competitive advantage, and how to analyse it, “you just ‘did business’”.

But Porter’s ideas stood in the middle of a five-decade development of strategy as a tool, honed by consultancies such as McKinsey and taught by management schools.

In the process, strategic planning developed first as a separate step in strategic management and later as a continuous process of evaluation and re-evaluation of the competitive forces.

As an idea, however, strategic management has proved hard to do well and worryingly easy to get wrong. As Richard Rumelt wrote in his 2011 book *Good Strategy/Bad Strategy*, “the gap between good strategy and the jumble of things people label as ‘strategy’ has grown over the years.” He pointed out that many organisations fail because their leaders think it is enough to lay out vision statements and lists of objectives without addressing the critical question of how to reach those goals.

Debate still rages about whether the discipline can, or even should, be codified or professionalised, even as strategy evolves. For the future, Richard Whittington of Oxford University’s Saïd Business School has suggested opening a new phase of study. He differentiates “small strategy” – about the financial performance of companies in competitive industries – from “big strategy”.

The latter applies to organisations that have wider impact, such as “state-owned oligopolies, eccentric family behemoths and control-hungry entrepreneurs”, but fall outside the normal area of research. **Andrew Hill**

50  
IDEAS

CORPORATE  
ETHICS AND  
REPUTATION

It is easy to forget that as recently as the 1980s, many businesspeople and business academics thought of ethics as at best optional, at worst irrelevant to companies’ central task of maximising shareholder value (see page 12).

But business schools scrambled to introduce or upgrade courses in ethics as part of their MBA programmes following the 2001 Enron scandal. The backwash of the financial crisis has given further impetus to attempts by companies to clean up their act. In 2009, the idea of an “MBA oath”, outlining values and ideals to which managers should adhere, began to take root.

In parallel, a series of crises has prompted companies to re-examine how they manage their reputations, in preparation for, and in reaction to, mishaps and mistakes. BP’s clumsy response to the 2010 Deepwater Horizon oil rig disaster and Toyota’s poorly handled product recalls have become case studies in reputation mismanagement. The transparency brought by social media (see page 17) – which allows critics, inside and outside the business, to amplify ethical, environmental or reputational problems – has given added impetus to companies’ attempts to improve their corporate culture.

**Disaster strikes:**  
BP’s Deepwater  
Horizon response  
has become  
a case study  
in reputation  
mismanagement





“  
 COMPANIES HAVE REALISED  
 THERE IS NO SHORT-TERM  
 FIX FOR ETHICAL AND  
 REPUTATIONAL DAMAGE  
 ”

Gradually, companies have realised there is no short-term fix for ethical and reputational damage. Rebuilding a corporate culture – as Barclays, hit by the Libor interest rate-rigging scandal, is discovering – takes time. Nor is corporate social responsibility, in its original form as a philanthropic effort separated from the business itself, sufficient to offset any perceived lapses in the core management of a company.

Instead, advocates of “creating shared value” – such as academic Michael Porter and consultant Mark Kramer – urge businesses to feed a virtuous cycle of good behaviour and mutual self-interest. By investing in the communities they serve, companies such as Nestlé, Unilever and Glaxo-SmithKline are managing to improve their reputation, develop their business, and create the conditions for future growth of the overall economy.

In the same pragmatic spirit, Archbishop Vincent Nichols, head of the Catholic Church in England and Wales, has urged corporate leaders to harness both the desire for profit maximisation and the need to do good, principled business. The question, of course, is how to balance these two essentials of modern capitalism. **Andrew Hill**

**50** BUSINESS  
 EDUCATORS AND  
 PROFESSIONAL  
 IDEAS ADVISERS

The first master of business administration programmes sprang up more than 100 years ago at the Ivy League universities in the US. Some 50 years later the growth in executive courses began, as the US government invested in intensive management programmes to retrain military personnel returning to work after the second world war.

But it was not until the 1980s that management consultancies and business school gurus really got their teeth into the corporate world.

The crossover between management consultancies and business school professors dates back to the turn of the 20th century.

Arthur D Little, the consulting firm, was set up by a professor from the Massachusetts Institute of Technology, and McKinsey by a professor from the University of Chicago. Some top management gurus have moved seamlessly between business school and consultancy, perhaps most notably Michael Porter, the Harvard Business

School professor who founded the Monitor Group.

That continues, with the consultancy firms having scooped up a third of all graduates from top-ranked MBA programmes in the past 20 years to feed demand from the corporate world for advice. In 2012, in spite of, or perhaps because of, the economic crisis, McKinsey was still the top recruiter in many of the best business schools in the US and Europe.

Corporate universities have also flourished, with companies such as General Electric training their own managers, helped by hand-picked professors. Growth in these in the US and Europe has stalled since the financial crisis of 2008.

But the economic climate is not the only threat to campus-based temples to business knowhow.

One of the biggest disruptive forces of the past year has been the rise in educational technology, enabling the online distribution of Moocs – massive open online courses.

Their promise, which is yet to be tested in the corporate world, is that they will bring the teaching of the world’s top professors to the desktop for free. **Della Bradshaw**

**50** LEADERSHIP  
 CULTURE  
 IDEAS

The idea of what constitutes great business leadership has changed more radically in the past 30 years than in the previous five decades and is in the process of changing again.

A shift from managerial capitalism to investor capitalism, particularly in the US, placed a premium on visionary, entrepreneurial, charismatic leaders, often endowed with imperial powers by hopeful shareholders and boards.

With that shift in the 1980s and 1990s came a wave of popular business literature, equating chief executives to warlike leaders, from Alexander the Great to General George Patton, and a



**Quiet thinkers:  
 recent research  
 suggests more  
 self-effacing  
 chief executives  
 perform better**

revival of interest in ancient “management” texts such as Sun Tzu’s *The Art of War* and Machiavelli’s *The Prince*.

But, as Nigel Nicholson of London Business School has written in his latest book *The T of Leadership*, “the lesson of history for leadership is that whatever worked yesterday won’t necessarily work tomorrow.”

The bubble in charismatic chief executives started to deflate in the early 2000s, pierced by corporate frauds at US companies such as Enron and WorldCom. The recent financial crisis laid low a further generation of aggressive leaders of the biggest banks.

Research by writers such as Jim Collins (*Good to Great*) and Rakesh Khurana (*Searching for a Corporate Savior*) has shown the appointment of a charismatic outside boss will not necessarily put a company on the path

to success. Often, lower-profile chief executives, frequently appointed from inside the company, performed better. “Self-effacing, quiet, reserved, even shy – these leaders are a paradoxical blend of personal humility and professional will,” Collins wrote. “They are more like Lincoln and Socrates than Patton.”

What Nicholson describes as our “infatuation” with leadership is unlikely to go away: the short-term success of bank chiefs, so soon after the cautionary tales of Enron and others, proves that. But radical thinkers such as Gary Hamel suggest the future of many companies will be as networked organisations, linked by social media, in which a premium is placed on teamwork. Such an evolution will put more emphasis on people-centred management and leadership qualities such as integrity, competence and adaptability. **Andrew Hill**

# Biotechnology



Big pharma faces new challenges, says *Andrew Jack*

**I**t can trace its roots to Europe's apothecaries in the Middle Ages and the 19th-century dye and bulk chemical producers of Germany's Ruhr valley, but the pharmaceutical sector has become a significant global industry in its own right.

Academic researchers and doctors make most breakthroughs, but the sector has supported the commercialisation of drugs that have contributed to a significant extension in the quality and length of life, with such benefits as higher productivity.

Drugs to reduce cholesterol and hypertension have eased the threat of heart disease. Treatments for asthma, HIV and rheumatoid arthritis have turned debilitating illnesses into more manageable chronic diseases. An effective cure for malaria exists and one for hepatitis C is in sight.

The sector employs hundreds of thousands of skilled staff, pays large sums in taxes, supports a global ecosystem of suppliers and spends more than \$40bn a year on research and development – typically 10-20 per cent of sales is reinvested, the highest proportion of any industry.

But big pharma companies are victims of their own success. New scientific breakthroughs have slowed, while rising regulatory and other barriers increase the costs of clinical development.

Selling more high-priced, high-margin drugs has left a hole to be filled, with generic competition escalating and health services balking at the bill.

The sector is busy trimming costs, re-examining pricing policies and outsourcing research to universities and smaller biotech companies.

Treatments to offset the effects of ageing remain one of the biggest

research challenges. But big pharma itself is in search of a remedy for its own ageing process.



MODERN  
PHARMACEUTICALS  
AND BIOTECHNOLOGY

When Greg Winter was a young scientist carrying out laboratory work in the 1970s, he saw the potential of using antibodies to tackle infection but had no idea of the extent to which his research would eventually be commercialised.

His efforts to “humanise” monoclonal antibodies (MABs) derived from mice, to tackle disease without excessive side-effects, paved the way for a modern category of medicines that has helped build the modern biotechnology industry and resuscitate large pharmaceutical companies.

Initially, much of the focus was on applications in cancer, and drugs such as Avastin for breast and colon cancer are among the results.

MABs exist in multiple sclerosis, asthma and beyond, while the most important impact has been in the treatment of rheumatoid arthritis, leading to blockbusters such as Humira, the first fully human MAB, which is now the world's second-best-selling medicine, generating more than \$9bn in revenues last year. The success highlights how complex, global and uncertain the process of biotech drug development is, relying on academic and government-funded research, and the vagaries of commercial support for development.

The UK Medical Research Council funded the original work in the 1970s of César Milstein and Georges Köhler to isolate MABs, for which they won the Nobel prize. Winter humanised them, and his colleague Michael

Neuberger developed a new technique to help. To date, the MRC has received some £600m in royalties as a result.

Winter says that traditional big pharma companies were initially sceptical, and it was smaller US biotech companies – notably Genentech and Centocor (now known as Janssen Biotech) – that worked to develop these pioneering biological treatments.

One of Winter's own companies, Cambridge Antibody Technologies, which developed Humira, was acquired in 2006 by AstraZeneca, which in turn licensed the drug to Abbott Laboratories. Its success was so great that investors' concerns that it would destabilise the rest of the business helped trigger the spin-off last year of Abbott's pharmaceutical arm into AbbVie.

Today, large pharmaceutical companies are keener than ever to buy biotech companies or license their most promising products. MABs and other biological drugs have provided an important shot in the arm for the survival of an industry dominated by chemicals until just a few years ago.

**Andrew Jack**

**Search for a formula: the biotech sector spends more than \$40bn a year on R&D**



HIGH-YIELD  
AGRICULTURE

In 1798 Thomas Malthus, the British theorist, postulated that the world's population would eventually outstrip the planet's ability to produce sufficient food for all, leading to widespread famine and death.

Nowhere did this dismal prediction seem likelier than India in the 1950s and early 1960s, when increases in grain production failed to keep pace with population growth, forcing New Delhi to depend on imported food aid.

# Copyright

“ THE GREEN REVOLUTION BROUGHT HIGH-TECH FARMING TECHNIQUES TO MILLIONS OF SMALL FARMERS ACROSS ASIA ”

Innovation must be protected, writes *Jane Croft*

Fears of imminent famine intensified after two droughts in the mid-1960s.

Today, however, India is self-sufficient in food grain. The turnaround is the fruit of the Green Revolution, which brought high-yielding hybrid seeds and other high-tech, intensive farming techniques to millions of small farmers across Asia.

The Green Revolution was driven by philanthropic organisations (the Rockefeller and Ford foundations), international agricultural research institutes that developed the new high-yielding seed varieties, and governments that ploughed money into fertilisers, irrigation networks and pesticides.

The transformation of many Asian countries from subsistence to surplus food producers has created business opportunities. Commodity traders such as Glencore, Cargill, Archer Daniels Midland, Noble Group and Louis Dreyfus have made billions of dollars from the processing, storage, transportation and distribution of wheat, oilseeds, sugar and agricultural goods.

Production of high-yielding seeds – dominated by Monsanto, DuPont and Syngenta – fertiliser and modern irrigation systems is also big business.

The Green Revolution has its critics. In India, many believe intensive cultivation has damaged land fertility and strained north India's water table, while many small farmers have been ruined by investing in expensive seeds that fail if there is not enough rain. But the avoidance of Malthus's dire prophesy is certainly reason to cheer. **Amy Kazmin**

**Years of plenty: maize production in India, which is self-sufficient in food grain**



COPYRIGHT AND INTELLECTUAL PROPERTY

Recent “patent wars” between mobile phone makers Apple, Samsung, HTC and others over smartphone technology have highlighted the importance of businesses being able to protect their intellectual property rights.

Copyright law and patents are vital to a thriving knowledge-based economy. For small companies that have invested in research and development and want to protect their assets, copyright and design laws are in practice the most cost-effective method.

Larger companies are more likely to apply for patent applications, which are seen as a more effective and expensive form of protection, particularly in sectors such as media and information technology where advances can give them a significant advantage.

Disputes usually follow the invention of new technology. Up until the early 20th century such legal battles occurred after the emergence of the telegraph and the radio – and even over mechanical farm equipment.

Now, in another period of rapid technological change, patent wars are centred on makers of internet technology, pharmaceuticals, music and films.

A high-quality patent system is vital to limit expensive litigation and ensure intellectual property is not devalued. As James Dyson, founder of the Dyson technology company, wrote last year: “We need to recall the inspiration behind patents. They are a spur for invention. They reward an inventor's investment with a fixed monopoly and in return they make their technology public.”

Keith Hodgkinson, chairman of law firm Marks & Clerk, says there tend to

be more patent disputes during a recession as companies experience pressure on their margins and seek to recoup income.

“Patent litigation usually follows big waves of innovation,” he says. “Also, if you have paid large sums to government – such as for 4G licences – you need to protect that investment.”

As countries move from being manufacturing hubs to knowledge-based economies, they become more interested in protecting their inventions. In 2011, a record number of international patent applications were filed – 181,900, up 10.7 per cent on 2010.

“As countries become more innovative they become more and more interested in intellectual property protection,” Hodgkinson adds.

Fast-growing economies are beginning to appreciate the importance of legal protection for intellectual property. China introduced its first patent law only in the mid-1980s, but recently overtook Japan in terms of the number of patents filed.

The value of patents can be seen in the trend for buying patents from bankrupt companies such as Nortel, the telecoms group. Eastman Kodak's digital imaging patents are expected to be among its most valuable holdings. When Google bought Motorola for \$9.5bn last year, there was some interest in the estimated 25,000 patents the internet search company would inherit.

But the growing number of disputes has led many executives and the judiciary to complain about the hundreds of patent cases that have become a costly distraction for large technology companies. Some have pointed out that litigation threatens to stifle innovation. Companies known as “trolls” are being set up specifically to buy patents and mount opportunistic lawsuits against successful groups. **Jane Croft**



# Industrial process

The drive towards greater flexibility and reduction of waste continues, writes *Robert Wright*

**W**ithin a year of Henry Ford's introduction of the first modern assembly line at his factory near Detroit in 1913, the system had slashed the time to build a Model T Ford from 12.5 man hours to just 93 minutes.

A century later, industrial engineers are still trying to reduce the inflexibility in Ford's system. The most eye-catching innovation is 3D printing, which could eventually make products as varied as Ford's Model Ts were identical. But even now information technology is cutting waste and boosting flexibility in many forms of manufacturing.

General Motors' Orion assembly plant, 30km north of Ford's old Model T plant, was redesigned to maximise its efficiency. Workers installing wiring, pipes and other small parts now receive individual, tailored component kits just as the relevant car body arrives, providing far more flexibility to vary output.

The plant also encapsulates some less obvious innovations borrowed from the lean manufacturing philosophy developed by Toyota of Japan. The assembly line is shorter, reducing the capital tied up in it, with the freed-up space used to bring in many parts suppliers, reflecting the shortening of supply chains in other manufacturing processes.

Orion has also brought back to the US work that had been done overseas – a nascent trend that also reduces concerns heightened since the 2011 tsunami in Japan and floods in Thailand.

The tsunami knocked out plants that were the sole source of some products. In an irony that might have amused Henry Ford – whose Model Ts were famously always the same colour – some black paints supplied to Ford were among the supplies affected.



## CONTAINERISATION AND GLOBAL SUPPLY CHAINS

It was in 1937, when waiting to drop off a load of wool at port in Hoboken, New Jersey, that Malcolm McLean is said to have conceived an idea that transformed the transport of goods.

McLean, a lifelong entrepreneur, had to wait most of the day to deliver the wool bales in his truck. He sat watching stevedores unloading trucks, putting bales into slings and hoisting them piece by piece on to vessels.

It would be much simpler, he reasoned, to take off the rear half of his truck and put that on the ship. "It struck me that I was looking at a lot of wasted time and money," he recalled later.

The epiphany prompted McLean to found Sea-Land, the world's first container shipping line, to carry boxes by sea without loading or unloading them at port. The first ship, the *Ideal X*, set off in April 1956, carrying 58 containers and a load of oil from Port Elizabeth, New Jersey, to Houston, Texas. According to industry legend, the heavy regulation of the trucking sector meant the trip cost the same as driving a single truck to Houston.

The effects would transform the business of moving manufactured and semi-finished goods. Ships could load and unload within hours rather than days or weeks. Quicker loading made larger ships possible but required bigger ports downriver from city centres.

However, the technology's most lasting legacy stems from Sea-Land's contract to containerise US military logistics during the Vietnam war. Sea-Land took to dropping off empty containers in Japan on the way back across the Pacific. The resulting opening-up of the

US electronics market to cheap, Japanese-made goods was a key step towards the integration of Asian manufacturers into a globalised world economy.

Yet it is only now that shipping lines are achieving the full efficiency benefits of McLean's innovation. This year, Denmark's Maersk Line will take delivery of the first of 20 ships capable of carrying 18,000 containers – more than twice as many as the largest ships 10 years ago.

Last decade's Asian export boom led to overordering of ships and a slump in vessel earnings, but those conditions show no sign of halting the wider adoption of McLean's simple but world-transforming idea. **Robert Wright**



## OUTSOURCING/ VALUE CHAIN DECONSTRUCTION

The vast container ships that sail into the ports of most developed countries are often thought to be full of cheap electronics, toys and other finished goods, bound for shop shelves. The truth is more complicated, however. Many of the containers bring components, chemicals and other semi-finished parts for industrial processes.

Those components are moving along production lines that stretch around the world. The question is how fundamentally the vast changes in the world economy following the 2008 financial crisis – and a series of shocks to supply chains following recent natural disasters – will reshape the system.

Many companies have started to carry less stock, concerned that they might again be left with significant unsold inventory in a downturn. That has further increased the pressure on shippers to deliver goods to a tight schedule.



“  
COMPONENTS ARE MOVING  
ALONG PRODUCTION  
LINES THAT STRETCH  
AROUND THE WORLD  
”

“We’re in a just-in-time world,” says Scott Davis, chief executive of UPS, the parcel and logistics company, a major beneficiary of the outsourcing trend.

Many manufacturers, facing rising wages in China and struggling to make quick changes to their product lines, have moved some operations to Mexico, Turkey and other countries nearer the world’s biggest consumer economies.

High oil prices are also a factor. Less time-critical goods that once went by air often move by ship or truck instead. And overall growth in freight movements is no longer outpacing economic growth to the same degree as it did for much of the past decade.

Many of the essentials of the international supply chain remain much as they were during the outsourcing boom of the 2000s, but are focused on serving consumers in a wider range of markets. Logistics operators are scrambling to acquire or set up better delivery operations in emerging markets.

“With projections that they will add 1m people a week for the next 30 years, we’re going to see cross-border trade stay very strong for years to come,” Davis says. **Robert Wright**

## 50 PROCESS INNOVATION IDEAS

The history of the control of industrial processes has been tied inextricably to the evolution of the computer.

In the early days of large-scale industrial production, the control of processes, for making products from chocolate to cement, was done by humans. A person would set in motion a series of manufacturing steps – for example, adding ingredients to a mixture to make an end product such as a foodstuff or an industrial chemical.

On the basis of set factors, such as the time normally regarded as the optimum for a specific process, the human controller would either stop the process or alter it – adding another set of raw materials or increasing the temperature of the reaction, for example.

Over time, mechanical or electronic systems have replaced the human element in this procedure. The biggest changes have come about as a result of the growing sophistication of small,

**Hitting the spot: programmable logic controllers have brought a level of accuracy to production lines far greater than humans can achieve**

cheap electronic computers – a development that gathered pace from the 1950s – followed by the advent of devices called programmable logic controllers (PLCs), devised in the late 1960s. These are computing systems that take in information from input devices, such as industrial sensors, and process data according to sets of software.

As a result of the processing, instructions are provided to output devices or actuators – gears, levers and control valves, for instance – to change the conditions of a specific reaction or set of processes. In this way, increasingly smaller, cheaper and more sophisticated computers can be used to monitor and adjust the way products are made across a huge range of industrial processes.

The “father” of the PLC is normally regarded as Dick Morley, an engineer who worked in the US for a small company called Bedford Associates. In 1968 an engineering team run by Morley drew up what is considered the first set of blueprints for how a PLC would work.

The initial customer for the devices was General Motors, the US automotive group, which used the systems to control parts of some production lines.

Modern PLCs use much the same principles to these early devices, but they rely on appreciably faster and smarter computing devices linked sometimes to hundreds if not thousands of sensors and actuators.

Such PLCs can control not just the production of discrete products, such as car parts, but also the entire operation of production lines making items such as steel or plastics through “continuous flow” procedures.

As a result, the degree of accuracy that can be achieved is many times greater than in the days when humans by themselves were in charge.

**Peter Marsh**

# Future ideas

“ WE HAVE TO GET BEYOND PHILANTHROPY. TO BE SUSTAINABLE MEANS MAKING A PROFIT ”

Our judges' pick of the ideas most likely to shape tomorrow's world of business



## FUTURE OF DRIVING

One of the more visible of mankind's changes to the fabric of the planet can be attributed to the motor car. Not only are vehicles to be found in almost every landscape, but the infrastructure that supports them is also inescapable. The ribbons of roads binding cities, towns and villages together are a testimony to people's infatuation with personal transport.

But the growth in the car population from near-zero to much more than 1bn in little more than a century comes at a price. Vehicles that are still marketed by manufacturers as freedom machines are, in many places around the planet, transformed by traffic to barely mobile cages.

Combine that with environmental concerns about even today's much greener vehicles, and the tide of public opinion about cars may well have turned – at least in much of the developed world. Mountain villagers in Nepal still compete to be the first to have a motorcycle parked outside their front door, and China is buying cars at a rate faster than any other country – but many young people in developed nations lack any interest in learning to drive.

This increasing trend is worrying the carmakers. The answer of Germany's BMW, for example, is a version of the car-sharing schemes run by Zipcar and others that are set to grow further and encourage use if not ownership.

Electric cars will become more prevalent, fast-improving battery technology reversing the slow take-up now – although there is still mileage in improving internal combustion engines. But the way users interact with their

cars will undergo a more fundamental change. Cutting down on accidents will become an ever greater part of regulation-enforced vehicle design – and the logical extension of that is giving the task of driving to computers. In the same way that autopilots have become essential on airliners, contributing hugely to safety, technology such as lane-assist and automatic braking will go from being driver aids to taking over the whole task. Such vehicles will revolutionise the way we use cars and what we do with the time we spend in them, as well as speed traffic flows by talking to each other.

Another answer to congestion, though, lies with two-wheelers. Enclosed, crash-protective, weather-proof, small motorbikes would take up less road space, save commuting time, and help to save the planet. That combination would indeed represent a point further on in our love affair with vehicles. **Rohit Jaggi**



## SOCIAL ENTERPRISE

Social enterprise is attempting to change the world by harnessing the innovation and discipline of business to tackle poverty, climate change and other challenges.

Peter Holbrook, chief executive of Social Enterprise UK and chairman of the Social Enterprise World Forum, says these businesses' "primary purpose is to tackle a social or environmental problem". That distinguishes them from a stock-market-quoted company, whose legal responsibility is to its shareholders first.

Pants to Poverty, which makes un-





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IN INDIA, FOUR OUT OF FIVE  
ENTRANTS TO THE LABOUR  
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ANY SKILLS TRAINING  
”

derwear using Fair Trade-certified cotton and guaranteeing workers a decent wage, is a riposte to the sweatshops of Bangladesh. Its products are premium but some consumers are willing to pay for minimum welfare standards.

Social enterprise works even better in the developing world, where the state is less effective. “There is huge appetite for social enterprises in Latin America and Africa,” Holbrook says.

In Brazil, a charity founded a business making battery-powered hearing aids that can be recharged by sunlight, reducing their cost for millions.

“It would take a lot of philanthropy to solve that problem,” he says. “We have to get beyond philanthropy. To be sustainable means making a profit.”

But government can play a role. The UK leads the world, with 62,000 social enterprises, employing 800,000 people and contributing £24bn to the economy, according to 2011 figures.

The new Localism and Social Value acts require public authorities to consider not just value for money but how much would be retained in a community when awarding contracts.

New forms of finance are emerging too. Big Society Capital, an investment fund launched in 2012, has £600m to help create a market. Some investors in the US and UK have embraced social impact bonds, which pay out if the business funded reduces government expenditure.

Even Russian oligarchs are interested. Vagit Alekperov, the Lukoil head worth \$14.8bn, has talked to Holbrook about funding social enterprise.

**Andrew Bounds**

**Economies that succeed will be those that can raise skill levels most effectively**



**UNSKILLED WORKERS**

If there is one business opportunity that could build prosperity and improve lives across the globe, it would surely be to raise the education and skill levels of those who currently lack them.

A certain amount of low-skilled labour will always be needed to clean offices and homes, pick crops, serve in shops and manufacture simple goods.

But as economies become technologically more complex, those that succeed will inevitably be those that can raise skill levels most effectively.

The task is daunting. According to the International Labour Organisation, China rates just 4 per cent of its workforce as highly qualified. Only 36 per cent of workers have a lower secondary-school qualification. The remaining 60 per cent have few or no skills. In India half of the country's population over the age of 25 has had no education and an additional third has at best primary schooling. Four out of five new entrants to the workforce have never had any opportunity for skills training.

Even in developed countries, where the low-skilled are a minority, they have been, along with young people, hardest hit by the financial crisis. According to the OECD club of mostly rich nations, low-skilled employment has declined by five percentage points more than overall employment since the crisis began.

That does not mean we should despair. Unesco says average years of

schooling for 15-24-year-olds in developing countries rose from 3.15 in 1950 to more than 8.5 in 2010 and average years of schooling for 15-24-year-olds in industrialised countries rose from almost seven years to more than 10.

Though a slow process the ILO says what is needed is better matching of supply to demand for skills, helping workers and enterprises adjust to change, and anticipating future skills needed. **Brian Groom**



**CHEAP AND FREE INFORMATION**

Increased access to cheap – and often free – information has already had an impact on business and society.

Social media such as Twitter played an influential role in the “Arab Spring”, helping topple governments in the Middle East and Africa. WikiLeaks sparked global controversy by publishing sensitive government and commercial information.

The free, and mostly illegal, sharing of films and music on the web has inflicted significant damage on content owners. Google and Yahoo and other content aggregators with user-friendly search capabilities have increased the availability of free information online. This has led many consumers to cut down on reading newspapers and magazines.

Meanwhile governments are



putting pressure on science journals to make academic papers – often funded by taxpayers – publicly available for free. This risks hurting the academic publishing sector led by Reed Elsevier.

In reaction, companies are experimenting with new business models.

Following wider adoption of legitimate digital outlets such as Apple's iTunes and streaming services such as Spotify and Deezer, the global music industry returned to growth last year for the first time since 1999.

A growing number of newspapers now operate a paywall as they seek new ways to monetise their content. Some allow access to a certain number of articles before payment is required. Google is unveiling a subscription service for some of its YouTube specialist video channels to add a second revenue stream beyond online advertising.

IDC, a market intelligence firm, predicts people accessing the internet via a personal computer in the US will shrink to 225m in 2016 from 240m last year – while numbers accessing the internet via tablet and smartphone will grow from 174m to 265m. If content owners can find compelling, imaginative and simple ways of charging for this content, they could attract a new breed of paying users. **Rob Budden**

**Some have a sentimental attachment to coinage while others argue that handling cash makes for more prudent spending**



## CASHLESS FUTURE

The use of plastic to pay for even the smallest of daily purchases such as a bus trip has been on the rise for years.

The introduction of near-field communications (NFC) also means we will increasingly never see the money we own in a tangible form and begin to regard this situation as the norm.

NFC, a short-range wireless technology that enables two-way transactions between tags and readers held close to each other, is already in use with travel cards and some bank cards.

But the dominance of smartphones, which can accommodate NFC chips, has raised the probability that consumers are on the cusp of moving to a “wave and pay” model, cutting out the need for cash.

Some argue that cash is, if not dead, at least dying, and traditional forms of money are already under assault elsewhere. Bitcoin, largely a digital currency,



is not issued or guaranteed by a central bank or government.

The benefit of NFC technology for consumers is simplicity. The advantage for retailers and companies is that making it easier for customers to part with their cash makes it more likely they will do so. Others argue that a cashless world will curb corruption and the underground economy.

But are these enough to banish coinage from the realm of daily life entirely and leave it to the numismatists? The evidence suggests not. The introduction of the modern credit card in 1958 and the wider use of plastic did not kill cash, with customers preferring to have a variety of methods to pay with.

They are also sentimental. As with books and paper, currency can be a thing of beauty as well as carrying the weight of legal guarantee. Others argue that handling cash makes for more prudent spending, while living on plastic encourages a slide into using credit.

Nor will the absence of cash necessarily curb crime: apart from criminals moving further online, phones and pre-paid cards can still be stolen.

Cash may no longer be king, but it is unlikely to disappear entirely from the NFC-enabled, electronic world.

**Jennifer Thompson**

## FUTURE OF DEMOGRAPHIC CHANGE

When the global population passed 7bn recently, the addition of about 1bn people in little over a decade marked the most rapid period of growth in recorded time.

But even more significant is that the birthrate in most industrialised and some emerging economies is slowing sharply while numbers of elderly are rising very rapidly.

Within the developed world, where old age social security systems predominate, life expectancy has risen from about 66 years at birth in 1950-55 to 77 years today. According to George



**Lower birth rates and rising life expectancy present significant challenges**

Magnus, an economist who has specialised in demographic change, rising life expectancy at older ages is “an existential threat to the economic and political framework we built after the second world war”.

Social security systems that depend on contributions from workers to pay pensions are under threat. Globally, on average, total fertility rates – live births per woman – have fallen from 4.95 in 1950-55 to 2.52 in 2005-10. Yet 2.1 is needed to keep a population stable.

UN data indicates that the percentage of the world's population aged over 60 will double from 11 per cent today to 22 per cent by 2050, while the percentage of elderly who are 80 and over will grow from 14 per cent to 20 per cent.

Worldwide, the number of people of working age available to support

each retiree will halve. That also means slowing GDP growth.

The issue is global. In China, a fertility rate of 1.6 children per woman means a working age population that has already peaked. In Japan, falling births and rising longevity have created a post-60 group that accounts for about a third of its total population.

Immigration can help make up some of the shortfall in workers – a strategy Japan has assiduously avoided. Governments can also raise pension ages and boost female participation in the workforce, with affordable child care and flexible working hours.

These shifts present substantial risk. But for businesses that can adapt their strategies early to take account of demographic change, the opportunities could also be enormous. **Norma Cohen**

# Judges



## MICHAEL SKAPINKER

The chairman of the judging panel, Michael Skapinker is an assistant editor of the FT and editor of FT Special Reports. He writes a weekly column on business and society that appears in the newspaper and online.



## LUCY KELLAWAY

Lucy Kellaway is an associate editor of the FT and a management columnist. For 18 years her weekly column has poked fun at fads and jargon, and she has celebrated the ups and downs of office life both in her column and in her books.



## CHRIS MCKENNA

Chris McKenna is an academic at the Saïd Business School of Oxford University, specialising in business history and professional service firms. He is a writer of business books, and his work has featured in a number of newspapers and magazines. He is also a fellow of Brasenose College, Oxford, and has also taught in the US as well as France.



## ANDREW HILL

Andrew Hill is an associate editor of the FT and the management editor, writing a weekly column. In the past he has also been financial editor and City editor, as well as New York bureau chief, and correspondent in Brussels and Milan.



## RICH LESSER

Rich Lesser is the president and chief executive of The Boston Consulting Group, the global management consulting firm. Before becoming chief executive this year he was BCG's chairman for North and South America. His client work has focused on innovation, strategy and large-scale transformation in the healthcare and consumer sectors.



## BARONESS KINGSMILL

Baroness Kingsmill CBE is a member of the House of Lords who after a 20-year legal career became deputy chair of the Competition Commission between 1996 and 2004. She is an adviser to a number of international companies and is a non-executive director of various British, European and US boards. She also writes a column for Management Today.

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