The Futures Report 2011
prepared by Global Futures and Foresight

"the future"

Sponsored by

steria

2010

Globalisation

The UK ranks 4th globally in its ease of 'doing business,' with Germany 22nd, France 26th, and India at 134th.

100 emerging economy companies total $1.3 trillion in 2009. Could multiply six-fold by 2020.

World economy to double by 2020.

By 2020 40% of the world's population will have achieved middle-class status.

By 2020 total E[...] could already b[...] than total G7 G[...]

Markets and economies

Global Foreign Direct Investment $1.6-$2 trillion in 2012.

Public debt is forecast to average 118% of GDP among the world's developed economies by 2014.

Between 2011-2020, France, Germany and the UK respective annual GDP increases of 1.7%, 1.8% and 1.7%.

The Smart City Market to quadruple by 2020 to become a $2.1 trillion market.

Various forms o[...] biotechnology [...] form a trillion d[...] market by 2020[...]

Business models

Creativity identified as the most important leadership competency for the successful enterprise of the future (IBM Survey).

Financial outperformers are 57% more likely than underperformers to use collaborative and social networking tools.

Networked organisations will focus on the orchestration of tasks rather than the 'ownership' of workers.

Work swarms proliferate by 2[...]

CSR and Green[...] mainstream by [...]

People and population

7 billion people living on Earth for the first time in 2011.

7 billion

2.2 million individuals will migrate annually from developing to developed countries (from 2005 to 2050).

The UK population[...] projected to grow [...] 1,100 people a day [...] the next decade (2[...] to 2020).

20%[...] of EU[...]

Urbanisation

As of 2010 London was the only European city among the world's largest 20 metropolitan areas.

"Europe is the only continent with cities growing at less than 1% annually".

India and China account for 62% of Asian urban population growth and 40% of global urban population growth from 2005 to 2025.

It took nearly 40 years (from 1971 to 2008) for India's urban population to rise by nearly 230 million; it will take only half that time to add the next 250 million.

250 million

Urban househo[...] true discretiona[...] power in India [...] increase sevenf[...] to 89 million, by[...]

Outsourcing

Wage drop raises attractiveness of UK for outsourcing.

Global Data Center Outsourcing market will reach $163 billion in 2014.

By 2020, 40% or more of an organisation's work will be "non-routine," up from 25% in 2010

Social media trumps email as the primary means of communication by 2014.
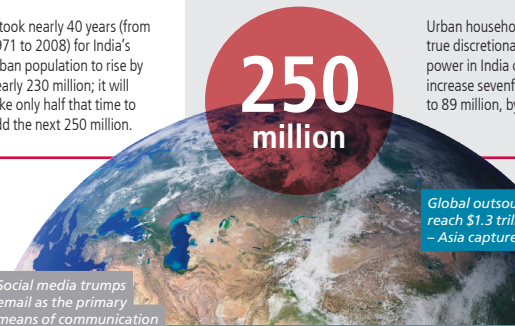
Global outsou[...] reach $1.3 tril[...] – Asia capture[...]

Technology

The latest 3D printers launched in March 2011 can print an object up to 8 square meters in volume, the size of a small car.

80-90% UK shoppers' decisions influenced online.

Global smartphone market is already larger than the PC market.

Only 25% of businesses will routinely use social network analysis to improve performance and productivity by 2015.

By 2014, 1 in 4 mobiles globally will be a Smartphone.

Virtual meetings to reach $18.6 billion by 2015.

By 2020, more than a third of all the information in the Digital Universe will either live in or pass through the cloud and will be 44 times as large as in 2009.

By 2020, Intern[...] reach 5 billion – [...] entire world's p[...] circa 1987. 1.7 [...] in 2010.

Environment

Only 10 percent of global waste is recycled. Global waste production has increased 50 percent in 20 years.

$46 trillion

Global 'Cleantech' industries need $46 trillion investment.

To stabilise the amount of carbon dioxide in the atmosphere will cost $542 billion per year, every year till 2030.

Europe will need to spend 2.9 trillion Euros (25% annual GDP over the 10 years to 2020 years to satisfy demand for low-carbon technologies.

Global energy consumption to rise by 49% between 2007 and 2035.

Work

As of 2009 there were 250,000 jobs in Germany's renewable energy sector.

Low levels of immigration and ageing workforce in EU places knowledge management front and central in the coming decade and beyond.

9% of UK employers are having trouble filling vacancies.

Germany and Italy will experience drops of 8% and 5% whilst the UK will experience a 2% increase.

97% say that having the right talent is the most critical factor for their business growth.

883% rise in UK employment for other business services by 2017.

(In France) the gre[...] of the environment[...] create or keep up [...] to 600,000 jobs by[...]

Government and legislation

In France the cost of stress is between €2 to €3 billion each year.

New UK government rules will reduce the number of jobs open to non-European skilled migrants from 500,000 to 230,000 – fewer than 1% of the UK labour force.

German national eGovernment strategy to commence in 2015.

By 2015, almost £10 billion of public money will be spent every year supporting the retirement of millions of public sector employees — up from £4 billion in 2010.

New energy standards require all new buildings constructed in Europe after 2020 to be nearly carbon-neutral.

7 GDP
e higher
DP.

More than 20 of the world's top 50 cities ranked by GDP will be located in Asia by the year 2025, up from 8 in 2007.

E7 GDP to be around 44% higher by 2030 than total G7 GDP in PPP terms.

World economic output will triple by 2050. China at $24.6 trillion and the US at $22.3 trillion dominate with India at $8.2 trillion.

$5.3 trillion

$24.6 trillion

of
could
ollar

The global chemicals market is set to reach a size of $5.3 trillion by 2020.

Nanotechnology, biotechnology and Smart City markets all worth at least $1 trillion by 2020.

2020.

goes
2020.

Emerging markets to pioneer new models and impact developed economies.

Open innovation and collaborative networks to prosper.

9.3 billion

n is
by
over
2010

of population
cities are Muslim.

India is the only major economy whose workforce is not set to age significantly by 2030.

100 million people would be needed to fill the gap (Population shortfall in the EU).

Dementia in Europe increases from 10 million today to 14 million people in 2030.

Britons over 85 to increase from 1.3 million in 2008 to 3.3 million by 2033.

Population to reach 9.3 billion by 2050.

Over 60's double to 21% of global population by 2050.

By 2050 the EU labour force would decline by around 68 million workers.

lds with
y-spending
could
old,
y 2025.

136 new cities to enter the top 600, all from the developing world overwhelmingly,

100 new cities, from China.

By 2030, six out of 10 people will live in cities.

70% of global populations will be urban by 2050.

Global infrastructure needs total more than $40 trillion.

70%

$40 trillion

rcing to
ion by 2020
es 80-95%.

India's Engineering Research & Development providers could capture a 40% share of global offshore revenues in 11 key verticals by 2020.

22 billion

t users will
equal to the
opulation
billion users

Korean goal - "a robot in every home by 2020".

By 2020 people will spend a large amount of time in virtual-reality worlds in which they will compete, socialise, relax, be entertained and do business.

Communication via hologram mainstream by 2040.

By 2050 a device the size of a micro-SD card will have storage equivalent to three times the brain capacity of the entire human race.

Artificial intelligence will surpass human intelligence after 2020.

By 2020 we expect to have over 22 billion devices communicating over the internet.

Fossil fuels account for 50% of the increase in total primary energy demand, renewable energy will triple between 2008 and 2035.

50%

1.2 billion people will still not have electricity by 2030.

China and India will consume a third of global energy by 2035.

Natural resource consumption is expected to rise to 170% of the Earth's bio-capacity by 2040.

One billion people could have been forced to relocate by 2050 due to climate change.

95% of global energy demand could be met by renewables by 2050.

ening
t could
2020.

50% growth in assignments by 2020.

By 2020 5 billion global micropreneurs will be connected.

steria

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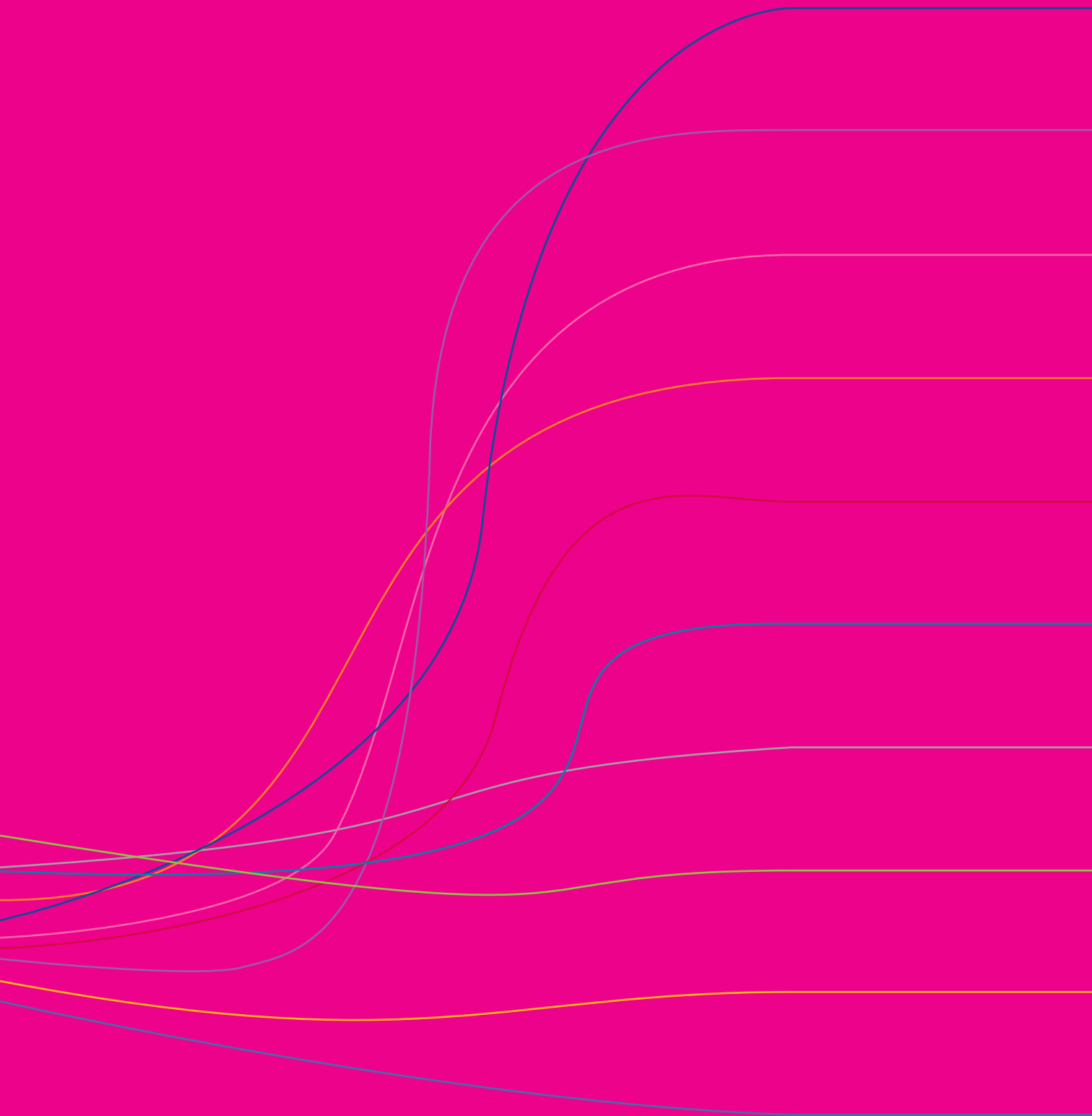
Public debt by 2020 to hit 131% in Italy, 124% in the UK, 114% in France and 97% in Germany.

131%

"the future" timeline

The Futures Report 2011
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Contents

Introduction

Any company looking to move forward with a winning portfolio of products and services must take account of the way their market and the world it inhabits will change and evolve. For that reason organisations like Steria consult with market analysts, advisors, influencers, and published research sources in order to understand our environment and likely future trends.

Whilst many people think of 'futurology' as a black art of speculation and imagination, we must start somewhere. In commissioning "The Future", Steria has requested that Global Futures and Foresight (GFF) analyse more than 150 published sources in order to provide a broad-ranging yet concise synopsis of our world's evolution across a range of topics throughout the next 40 years.

Of course an organisation of Steria's heritage is bound to include Outsourcing and Technology as two areas of consideration, but our clients know that we understand the importance of the broader context in which we all operate, and so in considering subjects as diverse as Globalisation and Business Models, this report is designed to prompt discussion with our clients and their customers to understand how we can all best position ourselves to take advantage of our future opportunity.

Steria believes in the Power of Sharing. Please take this opportunity to share "The Future", then let's talk.

Richard Potter
Group Innovation Director
Steria
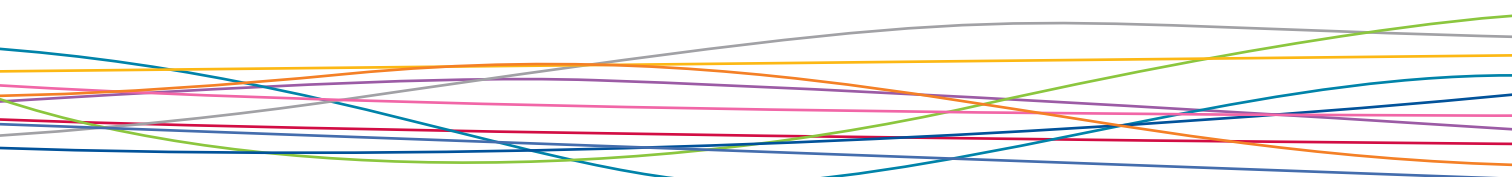
Executive summary

A great deal has changed in how we conduct business, where our economic activity takes place and where our markets are over the past few decades. We've seen information technology revolutionise our business and communications processes and today, the internet, social media, the cloud and an explosion of data are transforming our view of how we will do business in the next few years. Seismic shifts in our perception of continuity take place every now and again, such as the ash cloud from Eyjafjallajökull in Iceland, the Tsunami off the Japanese coast and our human failings in the field of financial services, that led to the global credit crisis and Great Recession. These reassure us that we have only faint claim to being able to control our complex physical and economic environments. The recent eruption of Grímsvötn volcano in Iceland has done nothing to settle well founded views that there really are things we have no control over in our world. We do however, have the ability to look ahead – to examine what's coming next – and we have a duty to do this for ourselves, our family, our shareholders, employees and business partners.

Change creates opportunities for new markets, products, services and economies to emerge. In the past 100 years of recessions, depressions and panics, as they were once called, many of the largest corporations we know today, were incubated and launched. Change is uncomfortable, but good for innovation and accelerated growth. It's also dangerous for leading players in their fields, as upstart, new entrants, take market share. Key drivers of change and their potential consequences, are laid bare in this report for you to consider and respond to.

Populations

We are confronted by the evidence of our rapidly changing world every day and are contributing to its change each in our own way. In the past 50 years, we've doubled the number of people alive on our planet, reaching 7 billion people this year. In the next 40 years we are expecting over 2 billion more people to be alive than today.

Economies

At the same time, and as a direct consequence of this population growth, we are forecasting that our global economy will triple in size by 2050[1] and is set to have doubled to over $130 trillion in just twenty years time, in 2030[2]. Much of this growth is amongst the emerging economies of the world, including China, Brazil, India, Mexico and Russia. As a consequence, by 2019 the E7, emerging seven major economies, will be a larger economic bloc than the G7 countries who have, for the past 60 years, led the world economically and to a great extent, politically. By 2050 China will have the largest economy with a GDP of over $24 trillion whilst the United States' economy is expected to reach $22 trillion and India the third largest economy at $8 trillion.
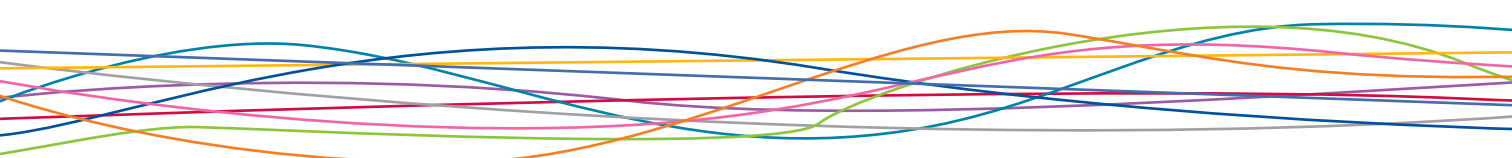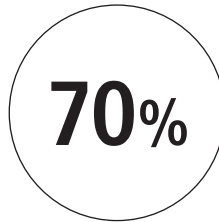
70 million

People entering middle class
every year

70%

People will live in
cities by 2050

$40 trillion

Needed for infrastructure
in the next 40 years

Political authority

Apart from the economic influence, that will shift from the US and Europe to Asia, the political authority will shift to these fast growing emergent nations. Turkey and Indonesia are included in the E7 and have populations that are predominantly Muslim. Equally, China and India are predominantly atheist and Hindu respectively. As political and economic power shift away from the predominantly Judeo-Christian populated countries of North America and Europe towards Asia, new governance, based on different values and beliefs, will begin to impact how business and the world are run.

Middle class

Of course, these two drivers of change, populations and economies, are having significant impact on us all. There's more economic activity in more countries than ever before, using increasingly scarce resources, creating wealth for the first time for billions of people. Over 70 million people are entering the middle class every year and most of them are from emerging economies.

Cities

As a consequence 20 of the world's largest 50 cities will be in Asia by 2025, up from only eight in 2007. In 2010 the urbanisation of the world reached 50 percent and it is expected that by 2030, six out of 10 people will be city dwellers, which is double the number back in 1950. By 2050 its forecast that 70 percent, of the then 9 billion people, will live in cities.

Infrastructure

All this concentration into our cities comes at a high price in terms of the infrastructure and resources that are required to sustain their populations. Over $40 trillion is required to be spent in the next 40 years to provide the infrastructure to support our choices to live in cities. We will need to develop new, innovative measures to provide food, water, waste management and all the other materials and services required by an increasingly wealthy and demanding city dwelling population.

Resources

China is expected to consume a third of all global energy used by 2035, much of which will need to be provided by renewable energy sources if we are to avoid the worst affects of global climate change. Already we've locked in a 1.4 degree temperature increase and can do nothing but mitigate its impact as the causes of that increase are already present. What we can do, and must do, is become dramatically more effective in managing how we use energy, recycle our waste and materials and how we consume. Many cities will experience a boom in cleantech services as part of the rapidly expanding response to this problem.
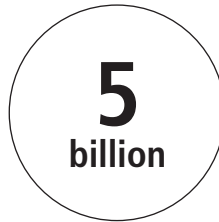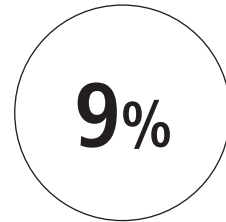
Executive summary

70%
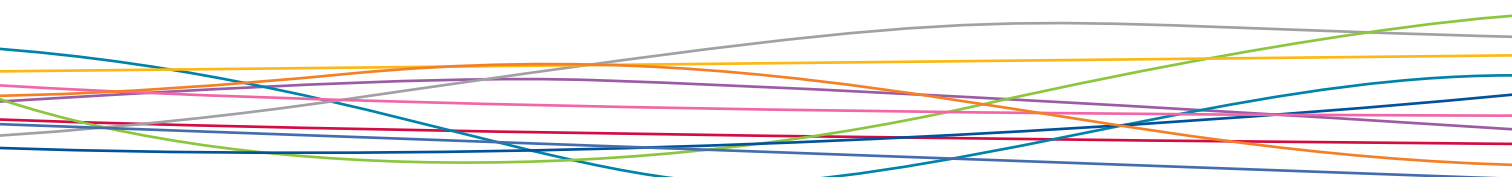
Increase in populations that will be born
in Muslim countries by 2050

5 billion

Population of the World
by 2050

9%

Amount employees are more productive
when allowed to access Facebook

Food

The population of 9 billion by 2050 will eat increasingly well and consume at the base calorific rate equal to 13 billion people today. We will therefore need to consider our consumption of meat very carefully. 70 percent of the increase in our populations will be born in Muslim countries. Consequently we will have to increasingly consider how food, meat in particular, and other goods and services meet emerging Halal standards. Ensuring that they will be acceptable to what will be, a third of the population by 2050.

Technology

Technology has powered much of the convergence in the world's economies and provided the know-how and access to global markets for those that are dramatically moving from feudal and agricultural economies to the more valuable industrial, service and intellectual property economies. The internet has expanded to reach 1.7 billion people today and is expected to reach 5 billion people across the planet by 2050. The raw materials of today's technology are not inexhaustible and indium, used in liquid-crystal displays, and hafnium, a critical element for next-generation semiconductors, could be exhausted by 2017.

Technology is birthing new business models and is set to continue its disruptive and enabling role in the coming decades. When once employees had access to the best technology at work, today it's more likely that their technology at home or in their hand is superior to their employers. Increasingly, companies should look to 'outsource' personal technologies to their employees enabling them to use their own mobile technologies at work.

Control

In the same way, firms will need to start to let go of control across their networks and allow their staff access to their preferred communication tools. Most of these are hosted in the 'Cloud', over the internet. Letting go of control of what passes across a company's intranet from the outside world can lead to more satisfied, engaged and happier staff, as they stay in touch with friends and work colleagues alike, across their favourite social networks. Some studies are showing that these same staff are then proving to be more productive than those prevented from accessing them. A recent Australian study showed employees to be 9% more productive when allowed to access Facebook. Of course, securing the company's data is the objective not preventing modern day communications.

Social media

Social media has lit-up every individual, who can now communicate across the globe in the same way as the richest corporation. Companies are increasingly becoming networks of collaborating firms and individuals operating across national boundaries. Where once vertical integration, enabled by technology, allowed us to gain economies of scale to make us competitive, today we retain, at the core, only what is necessary and outsource and partner with others to gain their capacity and capabilities for our organisations. Agility, creativity, innovation and collaboration are the watchwords for the successful company in the coming decades – which is no surprise given the amount of change we are being confronted by.
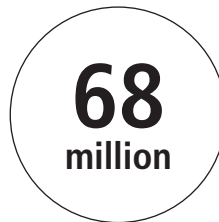
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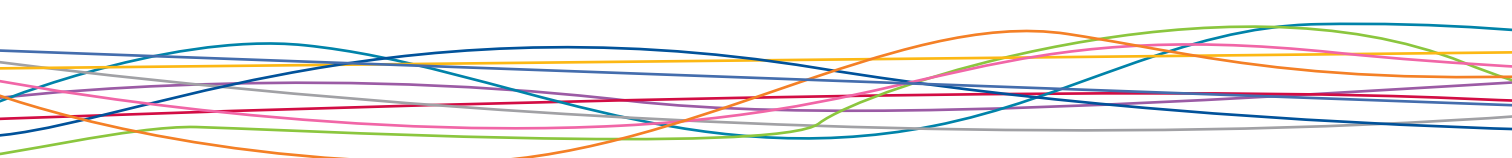
Internet growth in 2010

68 million

Working population in the EU
set to fall in the next 40 years

800%

Service based jobs increase
by 2017

Outsourcing

As we gain in confidence in being able to effectively collaborate with outside firms and individuals, we are letting-go of functions and processes that are important to our company's success and increasingly outsourcing them to others to manage for us. Innovation and creativity are two areas where we will increasingly invite others to help us, through means such as Engineering R&D outsourcing or through crowdsourcing, where we invite many people to help us discover our next product or service offering.

Online

Mobile technology take-up has overtaken desktop technology for the first time, putting more emphasis and importance on our internet presence. This next decade will be much about making sense of the mass of information available on the internet including who to engage with. The internet is estimated to have grown by 1.2 zetabytes last year, that's 1.2 million petabytes, and if that still doesn't make sense, that's more content than existed in every book in the world just ten years ago.

Peerindex and Klout are the latest online tools that are profiling individuals and organisations and scoring their authority, reach and following. Are we seeing the emergence of online tools that seek to illuminate those that have real insight and knowledge that could be of use to us, maybe as contractors, employees, advisers or distributors? If this is a trend then our messaging, its content, frequency and audience will become increasingly important to us, individually and as companies.

Workforce

The millennial generation believes that international assignments are important to their career development – employers agree. It's predicted that there will be an increase of 50 percent in international assignments by 2020. But, as we seek to align our company's behaviours with our Corporate Social Responsibility initiatives and government climate change abatement legislation, travel may be a frequent casualty. Increasingly we will use video, avatars and immersive technology to supplement our need to travel. As the working population across the European Union is set to fall by 68 million in the next 40 years we will have to be clear about what's automated, what functions require human interaction and how we facilitate those interactions.

Work

Work itself is changing, with new jobs coming on-stream that didn't exist ten years ago, as a direct consequence of urbanisation, increasing life expectancy, new technologies, globalisation and climate change. We expect that service based job roles will increase by over 800 percent in the UK by 2017 and those in the hospitality sector by over 200 percent. To maintain our workforce we will increasingly hire women, the aged and disabled people and probably have three or even four generations of employees in our firms for the first time in any numbers. The diversity of our workforce and the roles we will ask them to perform, in massively changing circumstances, will put even greater stress on them than they experience today. The direct costs related to stress at work are now estimated to be as high as 4 percent of EU GDP.
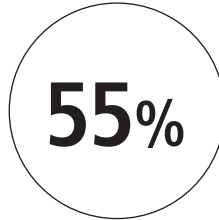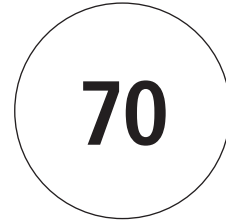
Executive summary

83%

UK's GDP by 2020

55%
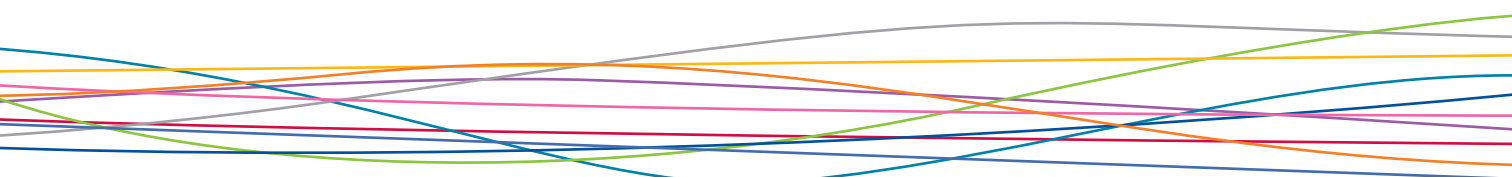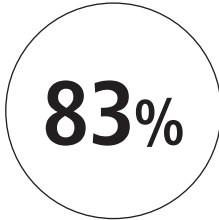
India's GDP by 2020

70

Age that EU member countries need
to raise retirement to by 2060

Government

By 2020 public debt in the UK is set to reach 83 percent of GDP, 114 percent in France and 97 percent in Germany. This compares to just 55 percent in India. Governments are recognising that they can no longer afford generous pensions and the European Union Commission has said that the average retirement age across the 27 member countries needs to rise from 60 today to 70 by 2060. Governments are rapidly turning to the 'Cloud' to service the needs of their citizens and today EU citizens can access 82 percent of basic public services online.

The working population will start to shrink from 2012 and unless a dramatic change in migration policy is forthcoming, companies will have to deal with the consequences of older workers and fewer workers in the labour pool in the EU. The EU is setting policy towards car free cities in Europe by 2050. This could be a boom or bust strategy. On the one-hand it will lead to innovation and the rise of cleantech and on the other it may put off investment and inward migration of companies. We will see.

Response

There is a great deal of change around. The game at-hand is to understand what's happening and determine if it offers you an opportunity you could embrace or if it is presenting you with a threat that you need to mitigate. At all great points of change, whether it be economic, technological, global, environmental or population change; new markets, industry sectors and players emerge. This is not a time for the faint-hearted. There is very little opportunity or value in standing-still and doing nothing. It is a time to engage with the change we will be encountering and ask for yourself, your family and friends and for your organisation – how can I best embrace it.

David A. Smith
Chief Executive Officer
Global Futures and Foresight
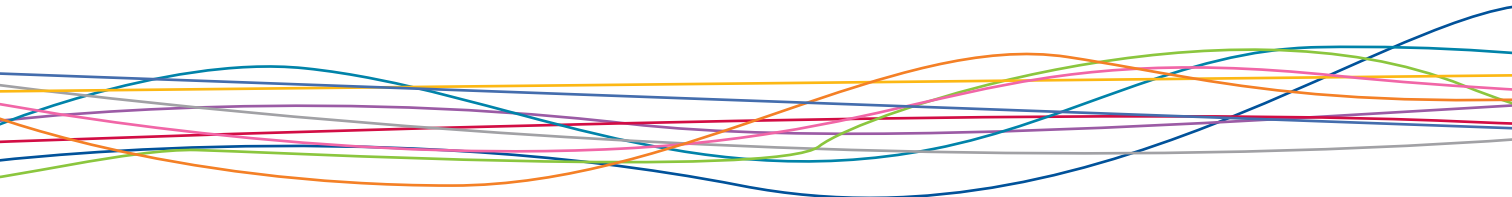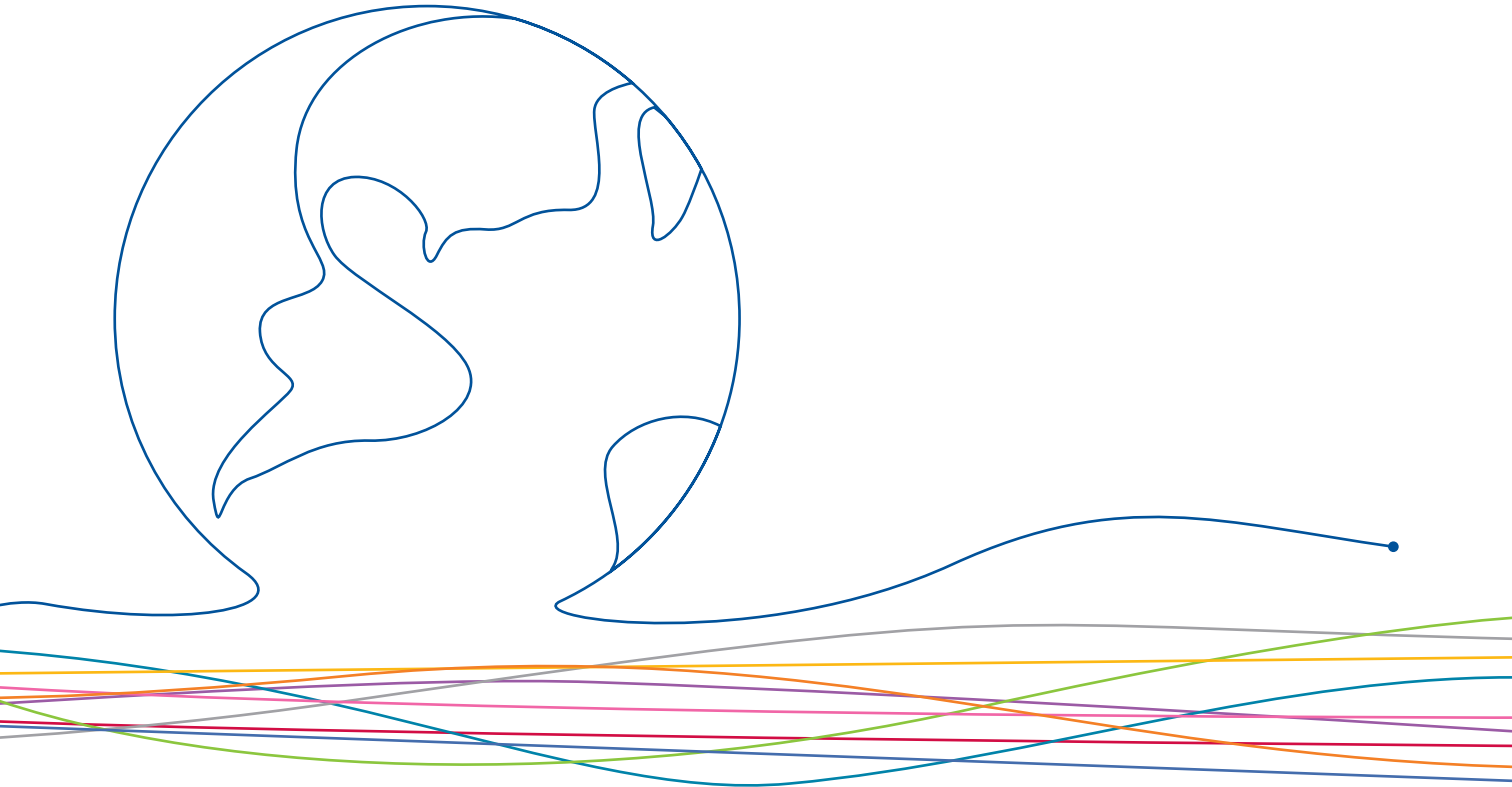
Globalisation

"World economic output will triple by 2050. China at $24.6 trillion and the US at $22.3 trillion will dominate the global economy, with India at $8.2 trillion far behind in third slot."
HSBC in January 2011[3]

"Convergent incomes and divergent growth – that is the economic story of our times. In short, today's divergent rates of growth between successful emerging economies and the high-income economies reflects the speed of the convergence of incomes between them"[4].
Martin Wolf, writing in the Financial Times, January 2011

The world economy grew threefold, to reach $62 trillion today, in just 20 years[5]. It is forecast that it will triple again by 2050[6], indeed it will have doubled to over $130 trillion in just 20 years time[7].

The Emerging Seven economies overtake the Global Seven economies

The rapid convergence between the E7 (emerging seven economies of China, India, Brazil, Mexico, Indonesia, Russia and Turkey) and the G7 (global seven economies of Unites States, United Kingdom, France, Germany, Japan, Canada and Italy) has been accelerated by the global financial crisis. In 2007, total G7 gross domestic product (GDP, a country's total economic output) at Purchasing Power Parity (PPP, the purchasing value in the local economy) was still around 60 percent larger than total E7 GDP[8], yet by the end of 2010, PriceWaterhouseCoopers (PWC, a global consulting firm) estimates the gap had shrunk to around only 35 percent. The catch-up process is set to continue over the next decade: by 2020 total E7 GDP could already be higher than total G7 GDP.

> World economic output will double by 2030 and triple by 2050

In the following decade, from 2020 to 2030, the process of overtaking is likely to be reinforced, with total E7 GDP projected to be around 44 percent higher by 2030. The gap would widen further beyond that, with the E7 almost twice as large as the G7 by 2050. The speed of convergence is important in more ways than one for the future of globalization, and its speed is quite remarkable considering how long the initial divergence in the 19th century took between the 'West' and today's emerging economies. Issues of trade, protectionism, international governance and geo-politics, not to mention global culture will all be impacted by the rate of convergence.

> E7 almost twice as large as the G7 by 2050.

A new middle class emerges

Technology has helped lower the boundaries and reduce isolationism, helping to democratise knowledge – a necessary precursor for convergence. As such, the comparative advantage of many western world countries has been reduced, whilst the emerging economies, with their generally higher populations, seek to benefit from the inflow of ideas and capital. McKinsey (a global management consulting firm) notes that '...more than 70 million people are crossing the threshold to the middle class each year, virtually all in emerging economies. By the end of the decade, roughly 40 percent of the world's population will have achieved middle-class status by global standards, up from less than 20 percent today[9].'

> More than 70 million people are crossing the threshold to the middle class each year, virtually all in emerging economies.

Economic power moves east

This not only augers well for fast moving consumer goods (FMCG, products that are sold quickly and at relatively low cost) majors in the western world, as Kraft, Nestlé and Procter and Gamble can testify, but also suggests we are at the beginning of a new shift in globalisation. Economic power is moving east, yet many of the world's major companies have remained headquartered in the U.S and other western nations.
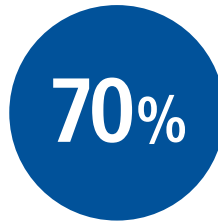
In a January 2011 report, The Boston Consulting Group (BCG, a global management consulting firm) identifies 100 emerging global challengers, about half of which could qualify for inclusion in the Fortune Global 500 within the next five years[10]. Overall, the global challengers generated
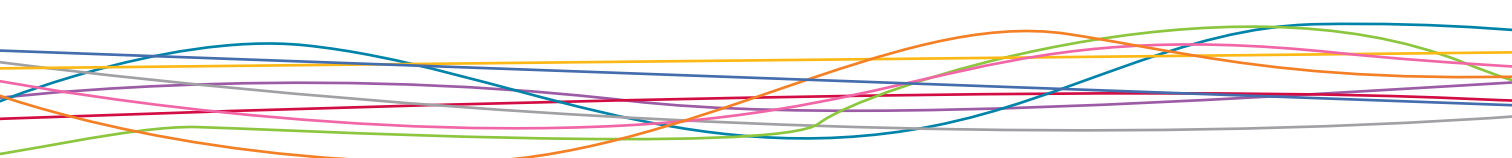
70 million

People entering middle-class
every year

70%

People will live in cities
by 2050

$40 trillion

Needed for infrastructure
in the next 40 years

revenues of $1.3 trillion in 2009. If these new challengers '...continue on their current growth path, they could collectively generate $8 trillion in revenues by 2020 – an amount roughly equivalent to what the S&P 500 (Standard and Poors 500, a list of the leading 500 US companies by market capitalisation) companies generate today.' Intense competition seems likely, yet the potential for partnering and trade is also great – for example; in exchange for established market access, reverse innovation (where products and services tailor-made for emerging markets find a niche in western economies) could be generated.

> The global challengers generated revenues of $1.3 trillion in 2009... they could collectively generate $8 trillion in revenues by 2020.

Unsurprisingly, China is the greatest contributor to the list of 100 global challengers, with 33 organisations, whilst India adds another 20. Whilst their contribution may be great, focusing solely on the Asian giants neglects other emerging world beating companies. Mexico with eight, has more than BRIC member Russia (six), whilst South Africa, Thailand, Indonesia, the UAE, Chile and Turkey have a combined total equivalent to India, despite having around a third of the population. The greater story is that globalisation is undergoing a change in its nature and its speed, and opportunities are opening beyond the not inconsiderable headlines.
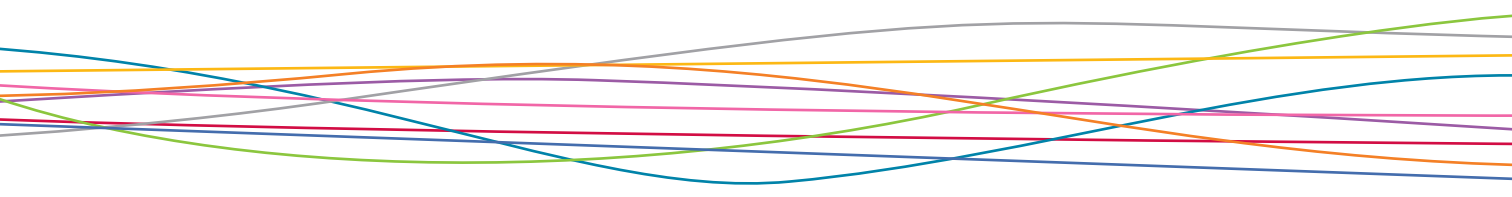
Getting easier to do business with

That is not to say that there are some considerable obstacles to further global integration. Leaving aside political considerations that should continue to restrict freedom of movement (in a working sense globally), issues remain with governance. However, the World Bank's report ' Doing Business 2011,' found that govern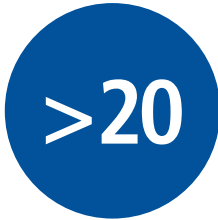ments in 117 of the 183 economies it surveyed had carried out 216 regulatory overhauls '...making it easier to start and operate a business, strengthening transparency and property rights and improving the efficiency of commercial dispute resolution and bankruptcy procedures.' This general move towards easing regulation should help globalisation. The World Bank notes that one of the most striking trends was governments' increasing use of the Internet to reduce paperwork, a development that makes life easier for start-ups and helps governments to capture taxes more efficiently. In Singapore, for example, almost everything is online, while Mexico has made great strides in helping small businesses use software to file taxes with minimum hassle[11]. The UK ranks 4th globally in its ease of 'doing business,' with Germany 22nd, France 26th, and India at 134th. As India and other economies witness a gradual lessening of red tape, their economies will become more competitive and their companies ever more expansive.
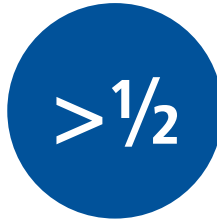
> More than 20 of the world's top 50 cities ranked by GDP will be located in Asia by the year 2025, up from eight in 2007

Globalisation

>20

The world's top 50 cities ranked by GDP that will be located in Asia by 2025

>½

European cities that will drop off the world's top 50 cities by 2025

3

North American cities that will drop off the world's top 50 cities by 2025

Top cities of the world

The location for this latest round of globalisation, although potentially benefitting London, Paris and other global centres, will take place primarily in Asian cities. More than 20 of the world's top 50 cities ranked by GDP will be located in Asia by the year 2025, up from eight in 2007. During that same time period, our research suggests, more than half of Europe's top 50 cities will drop off the list, as will three in North America. In this new landscape of urban economic power, Shanghai and Beijing will outrank Los Angeles and London, while Mumbai and Doha will surpass Munich and Denver[12].

Economies

IMPLICATIONS

→ Economic opportunity is already shifting eastwards.

→ Asian cities are set to be both consumer pacesetters and innovative hubs.

→ Emerging 100 companies are set to drive major change in the commercial economic power map of the world.

→ Significant business model changes may be needed to adapt to the new realities of globalisation.

Divergent economic growth rates amongst global economies, combined with high public debt in many western economies, are the major drivers shaping the future of global markets. Public debt is forecast to average 118 percent of GDP among the world's developed economies by 2014 (up from 78 percent in 2007).

Debt

Some suggest this might be sustainable if countries were willing to pay the price of high interest costs and slower growth[13], as has happened in debt burdened Japan throughout, and since, the 1990's. Whether or not economies can bear this debt burden will be key to their future standing. India is only predicted to have public debt equivalent to 52 percent of GDP in 2020. By 2020 the UK public debt could equate to 83 percent of GDP, Germany 97 percent, France 114 percent and Italy 131 percent[14]. All will nervously be watching Japan, where the figure could reach 246 percent by 2020 as a test of market patience.

Slower growth seems almost inevitable for the heavily indebted nations. Indeed in the decade 2011-2020, France, Germany and the UK are forecast to register respective annual GDP increases of 1.7, 1.8 and 1.7 percent with Italy registering 0.9 percent. By contrast, India is forecast to grow 7.3 percent a year. Such forecasts influence, and are influenced by, international flows of capital and foreign direct investment (FDI).

Investment

The United Nations Conference on Trade and Development (UNCTAD, 2010)[15] notes that the effects of the recession are receding in so far as companies are now planning to boost international investment, focusing on emerging economies in particular.

China, India and Brazil top the list of target countries for foreign direct investment until the end of 2012, pushing the US, for years the number-one destination, into fourth place. Although these flows will not match the volume witnessed pre-recession, the signs are there for records to be set in 2013/2014. In July, UNCTAD predicted that total FDI flows could rise to $1.3 – $1.5 trillion in 2011 after $1.2 trillion last year, and jump to $1.6 – $2 trillion in 2012. The highest total on record was $2.1 trillion in 2007, but this fell 16 percent in 2008, then a further 37 percent to $1.11 trillion in 2009 as the crisis left companies slashing spending.

> FDI flows could rise to $1.3 – $1.5 trillion in 2011

Given the very real need for infrastructure investment in India (between $1.5 and $2 trillion[16]) and other emerging economies, they would appear better placed than the US to absorb high level flows of international capital, although housing bubbles and other afflictions that affected the US and thus global economy, cannot be ruled out. The need for capital does not necessarily ensure its correct and productive allocation. Indeed whilst there are many barriers to India's growth, the twin dynamics of an ageing population and heavy public indebtedness ensure many western nations do not have the potential to rival the long term growth that is being, and should continue to be seen, in India.
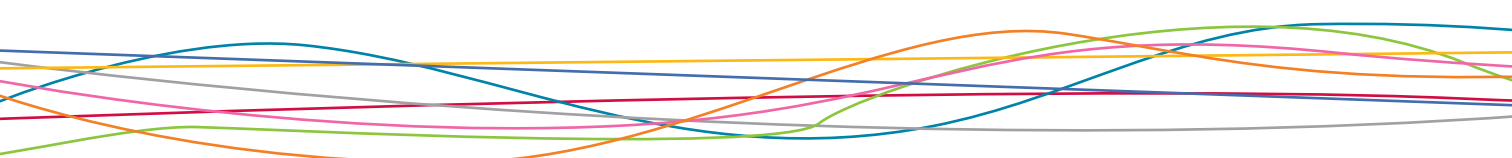
114%

Italy's public debt (percentage of GDP) by 2020

$660 billion

Industrial biotechnology growth by 2020

$2.1 trillion

The Smart City Market growth by 2020

Technology and outsourcing

One of the chief drivers in the global adjustment that we are witnessing is the spread of technology. In an open global system, barriers for education and technology are considerably lower, thereby reducing the previous comparative advantage held by Europe and the U.S. Economic isolationism is now pretty much confined to a few small outposts around the world. Outsourcing of manufacturing has been facilitated by global links and diffusion of technology, and there would appear to be very little, perhaps even fewer barriers than for manufacturing, stopping the gradual but inexorable outsourcing of increasing numbers of knowledge based jobs. However, to describe this process of technological transfer as zero-sum is to miss the dual edged nature of technological advancement, as industries with the potential to revitalise economies appear.

> One of the chief drivers in the global adjustment that we are witnessing is the spread of technology

Biotechnology

Industrial biotechnology, worth some $170 billion in 2010 is set to grow to $660 billion by 2020[17]. The biopharmaceutical market could also be worth $392 billion by 2020, up from less than $100 billion today. Another biotechnology industry, agricultural biotechnology, which deals with genetically modified (GM) crops amongst other things, is expected to grow from around $8 billion in 2010 to $50 billion by 2025[18]. Advancements in nanotechnology have to date, often proved to materialize at a slower rate than the often unrealized stellar pronouncements of market growth. Nevertheless, with nano-featured products filtering through to the consumer and governments investing significant amounts in R&D, predictions of a trillion plus dollar market (up to $2.4 trillion) by 2015 appear to have more credence than those made in the late 90's[19].

> Various forms of biotechnology could form a trillion dollar market by 2020
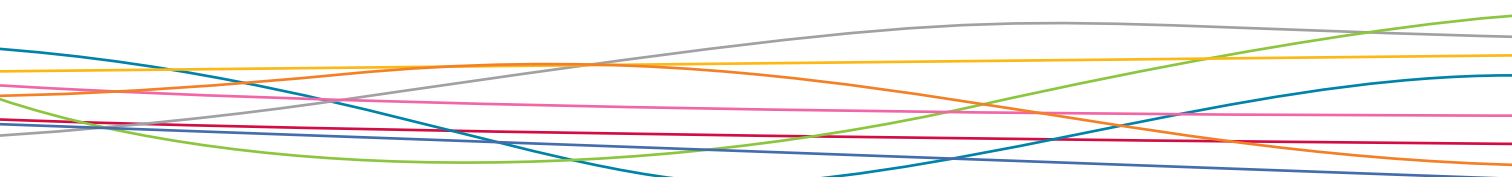
IMPLICATIONS

→ Foreign direct investment is starting to flow again – but to China, India and Brazil, rather than to the traditional destination of the USA.

→ Debt issues in the 'west' will suppress consumer and government spending.

→ New industries will grow around the environmental, bio, nano, and other technologies and will become fundamental to growth in the European Union.

→ The 'production with services' business model is better suited to the high cost economies of the EU.

Smart cities

The Smart City Market, comprised of Smart Grids, Green Buildings (low energy consumption and high recycling of waste) and integrated low carbon transportation options is also forecast to quadruple in size by 2020 to become a $2.1 trillion market[20], whilst green environmental products and services are projected to hit $2.74 trillion according to the UN[21].

Emerging high growth industries

The UK Government notes that '...there are strong opportunities for growth in the UK economy through the 2020s if businesses can harness scientific and industrial capabilities to take advantage of technology-enabled transformations in manufacturing, infrastructure and the internet[22]'. Indeed it suggests that '...By the 2020s, the UK could lead a 21st-century manufacturing revolution, fuelled by new technologies, tools and materials, with local, bespoke manufacturing-on-demand based on 3D printing and a move to product plus service commercial

> green environmental products and services are projected to hit $2.74 trillion

models.' Targeting economic policies and support will be necessary to realise such a position, but with few other options for economic growth on the table for the UK, this may become a strategic priority.

German specialisations are already developing around some advanced technologies. Germany's Federal Ministry of the Environment[23] notes that '...the German environmental industry has easily surpassed all growth forecasts. By 2020, it will be the country's foremost industry, accounting for 14 percent of GDP.' German players are already positioned among the world's technological front-runners, for example with regard to photovoltaic's (light source direct energy generation). Revenues from environmental industries will more than double from the 2009 figure to €3,100 billion by 2020.

> The German environmental industry has easily surpassed all growth forecasts. By 2020, it will be the country's foremost industry, accounting for 14 percent of GDP.

Nevertheless, the need for a comprehensive EU strategic growth plan is pressing. The global chemicals market is set to reach a size of $5.3 trillion by 2020[24], yet KPMG (a global management services firm) (2010) notes that '...new global capacity being developed in the coming years will render 14 of 43 chemical crackers in Europe uneconomic by 2015. The closure of these plants would correspond to the loss of 26 percent of total cracker capacity in Europe. At the same time, Middle Eastern chemical producers continue to seek expansion along the value chain into higher value-add solutions. Their Chinese counterparts are attempting to fulfil a government directive to make the country self-sufficient in chemicals. These Middle Eastern and Chinese entities are often cash-rich and backed by government support.'

Populations

In late 2011, according to the United Nations (U.N.) Population Reference Bureau, humanity will reach a new demographic milestone with the birth of the 7th billion living person[25]. The global population is set to continue to grow and reach 9.3 billion people by 2050[26]. In 1960 the global population stood at 3 billion. This equates to the addition, on average, of 78 million people per year between 1960 and 2011 – in effect adding the modern day population of Turkey to the planet, every year.

Population growth and decline in Europe

The picture on a regional level is somewhat more nuanced. On 1st January 2010, the population of the European Union's twenty seven member states (EU27) was estimated at 501.1 million, compared with 499.7 million a year earlier[27]. Even within Europe there are countries with outright declines in overall population, such as Germany (-2.5 percent relative decrease) offset by countries experiencing higher relative growth such as the UK (+6.7 percent). The population of the United Kingdom has reached almost 62 million, the Office for National Statistics (ONS, June 2010) notes[28], with 45 percent of year on year growth between 2008 and 2009 coming from migration. The UK population is projected to grow at its fastest rate since the post-war 'baby boom', increasing from 61.4 million now to 70.6 million in 2030. According to the projections, growth will be driven in part through natural change – more people being born than dying – and also through net inward migration – more people arriving in the UK than leaving[29].

> The UK population is projected to grow at its fastest rate since the post-war 'baby boom', increasing from 61.4 million now to 70.6 million in 2030

Much of the UK's population growth has occurred in its cities. The urban population of the UK rose from 50.3 million in 1990 to 53.5 million in 2005. This figure is expected to increase over every five-year period up until 2030, at which point it is expected to reach 59.6 million[30]. The UK population is projected to grow by 1,100 people a day over the next decade (2010 to 2020)[31].

Ageing populations

Profound in its implications for pension schemes, taxation, business talent, economic competitiveness not to mention health and service provision, ageing will affect almost every global economy in the coming years.

The ONS suggests the oldest age group is likely to grow the most quickly with the number of Britons over 85 set to more than double over the next 25 years from 1.3 million in 2008 to 3.3 million by 2033. The numbers of centenarians is set to rise from 11,000 to 80,000 by 2033[32].

> Over the next couple of decades nothing will impact OECD economies more profoundly than demographic trends and, chief among them, ageing

Ageing is also far from being confined to the eldest of age groups. As of 2010 there were 10 million people in the UK over 65 years old. The latest projections are for 5.5 million more elderly people in 20 years time and the number will have nearly doubled to around 19 million by 2050[33]. However, the UK looks set for somewhat of a demographic dividend compared to some of its European neighbours.
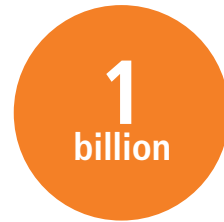
59.6 million
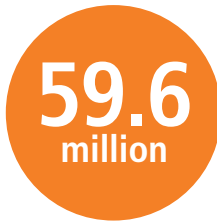
UK population
in 2030

19 million
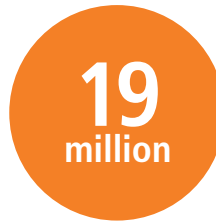
Elderly people in UK
by 2050

1 billion

People forced to relocate by 2050
due to the effects of climate change

Implications of ageing European populations

Due to ageing and low fertility, by 2050, in the unlikely absence of immigration, and at constant labour force participation, the European Union (EU) labour force would decline by around 68 million workers[34]. The fiscal impact of ageing is projected to be substantial in almost all member states,' says an EU report. It predicts that spending on pensions,

> By 2050...
> the European Union labour force would decline by around 68 million workers

healthcare and long-term care will increase by 4.75 percent of GDP by 2060 in the EU as a whole and by 5 percent in the eurozone (the 17 EU member states who share a common currency in the euro). The European Commission predicts that 'annual GDP growth rate' will 'decline significantly in the future,'

with a smaller working age population acting as a 'drag on growth and on per capita income[35].' The nature of European ageing will ensure an unprecedented rise in diseases of old age, such as dementia – which is set to increase considerably in incidence from about 10 million today to about 14 million people in 2030. The forecasted cost for the EU of such a process is over €250 billion[36], roughly equivalent to the Irish and Greek bailouts combined. The World Economic Forum has noted that when populations fall, '...productivity must increase to balance the equation[37].'

Youthful India

India, meanwhile, is the only major economy whose workforce is not set to age significantly in the next twenty years. That is to say, that given the extremely youthful population, '...India finds itself with a potentially higher share of workers as compared with dependents. If working-age people can be productively employed, India's economic growth stands to accelerate[38].'

Migration

Whilst population growth is more smoothly forecast than say economic growth, being as it is slower to respond to external events, there are a couple of wildcards that could affect future population growth. One

> Over 2.2 million people will migrate annually from developing to developed countries over the next 45 years

concerns political decisions regarding the flow of people. The other, sometimes related factor, is that of migration. In 2005 the UN predicted that over 2.2 million people will migrate annually from developing to developed countries over the next 45 years[39]. Although large, this figure is dwarfed by the potential impact of climate change. A

number of non-governmental organisations (NGOs) have predicted as many as one billion people could have been forced to relocate by 2050 due to the effects of climate change, although numerous studies suggest local migration a more likely response than international movement as a result[40].

Despite diverging economic growth that points to long term convergence between the UK and Indian economies on a per capita (individual) basis, India was still the most common country of last residence for

IMPLICATIONS

→ Mass economic and climate related migration can be expected.

→ Consumers and employees are becoming older and more ethnically diverse in many European markets.

→ Increasing productivity in ageing markets is essential if their economies are to avoid protracted difficulties.

→ Losing the smartest talent to more attractive economies will hamper R&D and innovation.

immigrants into the UK in 2009, exceeding Poland for the first time since A8 (the eight countries who most recently joined the European Union) accession in 2004. Immigration from India totalled approximately 63,000 in 2009, up from 46,000 in 2005. Poland, with approximately 33,000, saw a drop from a peak of close to 90,000 in 2007[41].

> The EU trains more scientists, but does not keep them

The European Union produces more science PhDs per capita than the US, but it ends up with fewer researchers. The EU trains more scientists, but does not keep them. For the EU to achieve its target of 3 percent of GDP to be invested in research, it would need some 700,000 extra researchers. But, in reality, the EU suffers a net loss of graduates to the rest of the world. It loses some of its brightest to the US and the return rates are actually falling[42].

Purchasing power

The economic driver, a strong factor no doubt in much migration, will undergo drastic change in the period to 2020. From 2011 to 2020, per capita GDP growth in the UK, Germany and France will average 1.0 percent, 1.8 percent and 1.3 percent respectively, whilst Indian growth per head will average 5.8 percent (despite an even higher rate of GDP growth). On an individual level this still leaves a sizeable gap in earning power, even at purchasing power parity levels. Indeed at purchasing power parity levels (US=100) the UK was 81 percent in 2009, whilst India equated to a score of 7 percent. Despite economic

growth lifting India past Britain, Indian purchasing power will remain low, at 15 percent. UK purchasing power parity versus the US rises to 83 percent by 2030. Whilst familial ties remain, it would seem, the economic driver for the specific India-UK migration route.

Ethnic Mix

In terms of ethnic mix, the UK's future is already partially assured; that is to say, a move towards plurality will occur even without additional inward migration, thanks to higher birth rates among some ethnic groups.

A 2007 study from the Barrow Cadbury Trust[43] predicts that the population of white Britons will fall below 50 percent in many towns and cities within

> a net gain of some 100 million people would eventually be needed to fill the gap (Population shortfall in the EU

30 years, with some communities such as Leicester experiencing this by 2020. Europe, with a worse demographic dividend than the UK will perhaps need an even greater rate of change to fulfil its economic imperative. The EU's Reflection Group, noting the potential loss of 68 million workers in the coming decades suggests that '...since not all immigrants become economically active, a net gain of some 100 million people would eventually be needed to fill the gap. Realistically such a large net intake over the next 40 years is neither likely nor necessarily welcome.'
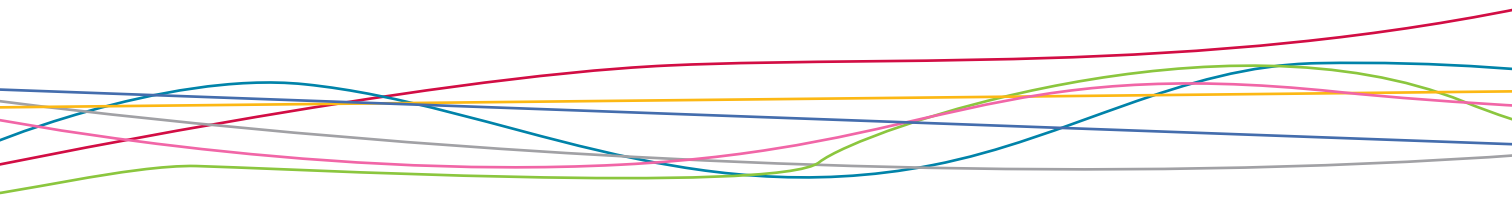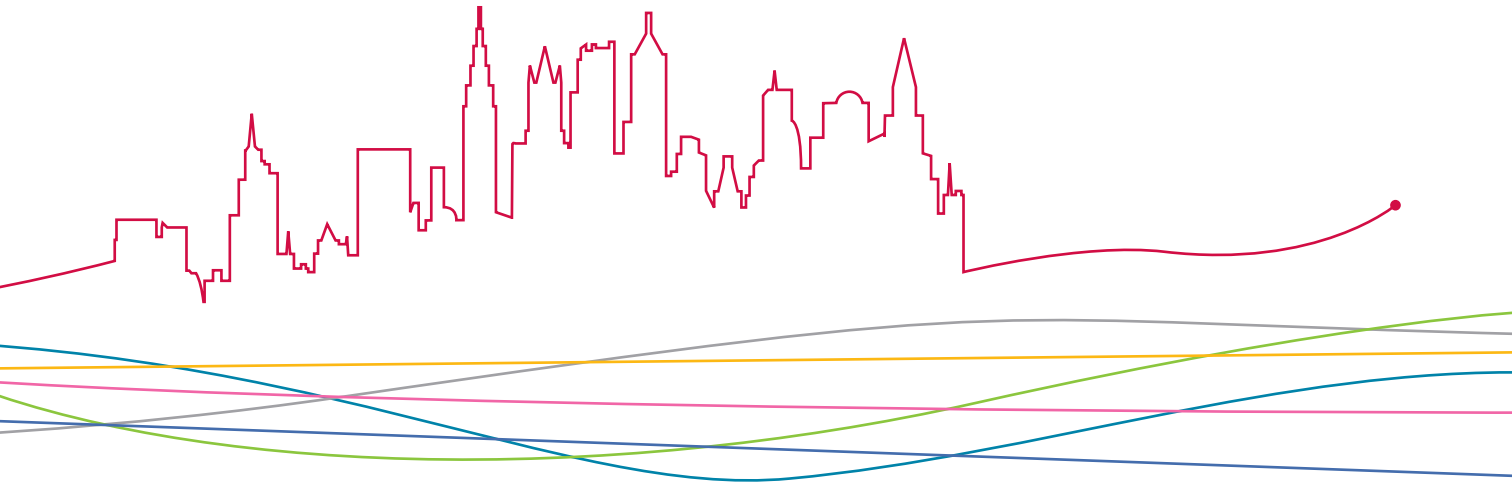
Urbanisation

'The future of the world lies in cities,' says London's Mayor Boris Johnson. 'Cities are where people live longer, have better education outcomes, are more productive,' Johnson notes, adding that cities are also where people emit less polluting carbon dioxide per person[44].

Infrastructure

Globally, by 2030, six out of 10 people will live in cities. This will result in a greater demand for power, water and transportation services[45].

> Globally, by 2030, six out of 10 people will live in cities

The extent of which is quite staggering; the Organisation for Economic Co-operation and Development (OECD) estimates that more than $40 trillion could be spent worldwide on infrastructure projects before 2030[46]. Europe, largely in the form of renovation, stands to invest some $9.5 trillion with Asia set to invest a collective $15.89 trillion[47].

Urbanisation

Robert Peto, president of the Royal Institution of Chartered Surveyors (RICS)[48] reminds us of the rapid progress urbanisation made throughout the 20th Century and continues to make. In 1900, around 14 percent of the world's population lived in cities, by 1950 this had risen to 30 percent and today is 50 percent. Currently, there are more than 400 cities with a population over a million, 19 of which have over 10 million inhabitants[49]. This remarkable growth has created vast infrastructure investment needs and this seems set to continue as experts predict that 70 percent of global populations will be urban by 2050.

Despite seeming continuity of the trend, the drivers underpinning it reveal a sea change underway. The rise of urbanism will continue to have profound impacts on business, national economies and the environment, but the location of such urbanism is decidedly shifting. Emerging economies are set for the largest urban growth, both in terms of population and GDP. India and China will account for more than 62 percent of Asian urban population growth and 40 percent of global urban population growth from 2005 to 2025[50].

> It took nearly 40 years for India's urban population to rise by nearly 230 million; it will take only half that time to add the next 250 million

India alone is set to add 215 million people to its cities, whose populations will account for 38 percent of the Asian urban total of 2.5 billion in 2025. It took nearly 40 years (from 1971 to 2008) for India's urban population to rise by nearly 230 million; it will take only half that time to add the next 250 million. The speed of urbanisation is troubling in terms of town planning yet confers massive economic potential – McKinsey explains that a $1.1 trillion capital investment in India's cities is necessary to meet projected demand for urban services. To put that figure into context, the Australian economy, largely unaffected by the global recession had a GDP of $924 billion at the end of 2009[51].
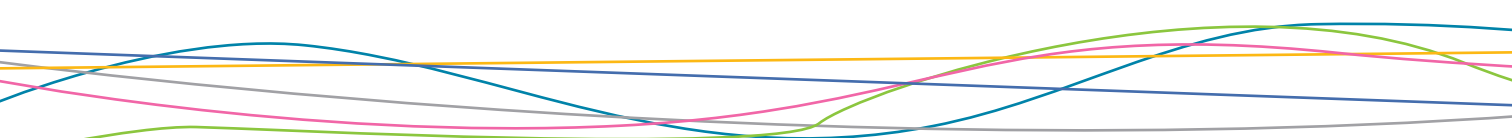
$40 trillion

Worldwide spend on infrastructure by 2030

215 million

Urban population growth in India by 2025

100

New cities expected to enter the top 600 cities just from China by 2025

The potential for business goes far beyond infrastructure investment however. In India, urban per capita GDP is projected to grow at a rate of 6 percent a year from 2005 to 2025, while China will see growth of 7.3 percent. The number of urban households with true discretionary-spending power in India could increase sevenfold, to 89 million households, by 2025[52]. The pace of such urbanisation in China and India, combined with the rate of GDP increase in the world's two most populous nations has never been seen before and will certainly reshape and give rise to new forms of business, innovation as well as global power structures.

Consider for example, that in 2007, half of global GDP came from 380 cities in developed regions, with more than 20 percent of global GDP coming from 190 North American cities alone. The 220 largest cities in developing regions contributed another 10 percent[53]. By 2025, one-third of these developed market cities will no longer make the top 600 cities; indeed, 136 new cities are expected to enter the top 600, all of them from the developing world and overwhelmingly — 100 new cities — from China.

IMPLICATIONS

➔ Huge infrastructure investment is needed, but governments may struggle to fund them, as a result new business and funding models will emerge.

➔ The future of the global economy lies in Asian cities. European city growth is forecast to be low.

➔ CO_2 emission reduction policies could be an inhibitor to European cities economic growth.

➔ Cities have more in common with each other across the world than they have with other towns and villages in their own countries.

European urbanisation

Urbanisation in the UK and Europe cannot and will not, match the rate and rapidity of emerging economies. The urban population of the UK rose from 50.3 million in 1990 to 53.5 million in 2005. This figure is expected to increase over every five-year period up until 2030 (the end of the estimated projections), at which point it is expected to reach 59.6 million[54]. Whilst the UK population is forecast to grow by 1,100 people a day over the next decade (to 2020)[55], it will not be enough to maintain London's position amongst the top 20 global cities in population terms.

As of 2010 London was the only European city among the world's largest 20 metropolitan areas

As of 2010 London was the only European city among the world's largest 20 metropolitan areas[56]. Paris is 22nd. Among the top 25 cities, they are two of the three slowest-growing areas. Europe's main metropolitan areas grew just 28 percent between 1965 and 2010, a period during which the global growth average in urban areas has been 135 percent.

Europe is the only continent with cities growing at less than 1 percent annually. Without the prospect of suddenly leaping fertility rates, the prospects for further large scale urbanisation in Europe look slim, Europe is the only continent with cities growing at less than 1 percent annually which in turn raises questions about the future of economic growth in the continent. The announcement of a shift to car-free urban living and majorly reduced CO_2 emissions in 500 EU cities could be a move towards a new economy not dependent on fossil fuels, but might also be interpreted as a growth inhibiting policy further complicating economic growth. However, fDi Magazine, in its Cities of the Future 2011 report[57] for Europe notes that London and Paris are first and second place with regards to future outlook (comprising business friendliness, human resources, economic potential, infrastructure and a number of other criteria). There are also four German cities in the top 20.
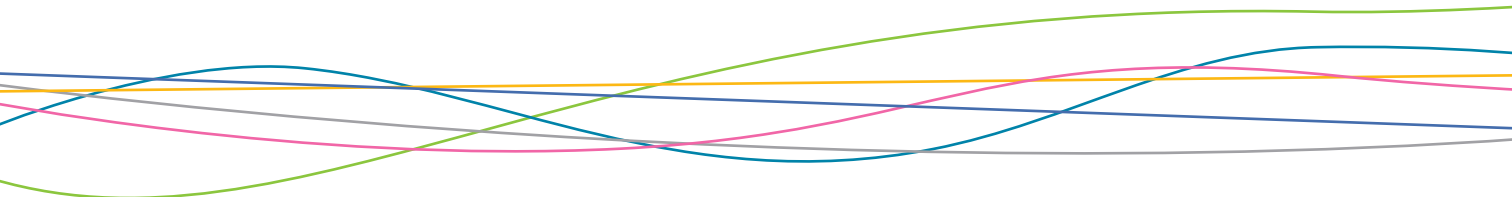
Environment

The International Energy Agency (IEA), Outlook 2010 forecasts[58] global energy consumption to rise by 49 percent between 2007 and 2035, with the largest increase in demand to be found in non-OECD countries. The increase equates to a 1.4 percent rise per year. In 2007, energy use in non-OECD nations was 1.5 percent higher than that in OECD nations. In the IEA2010 forecasts, non-OECD economies will consume 32 percent more energy than OECD economies in 2020 and 63 percent more in 2035.

China and India energy

Two nations that were among the least affected by the global recession were China and India, and they continue to lead the world's economic growth and energy demand growth. Since 1990, energy consumption as a share of total world energy use has increased significantly in both countries, and together they accounted for about 10 percent of the world's total energy consumption in 1990 and 20 percent in 2007. Strong economic growth in both countries continues over the projection period, with their combined energy use more than doubling and accounting for 30 percent of total world energy consumption in 2035.

> China and India will consume a third of global energy by 2035

Fossil vs renewable energy

> Fossil fuels will account for over 50% of the increase in total primary energy demand, whilst modern renewable energy will triple between 2008 and 2035

The IEA, in its Outlook 2010 report, predicts that fossil fuels – coal, oil and gas – will account for over 50 percent of the increase in total primary energy demand, whilst modern renewable energy – including hydro, wind, solar, geothermal, modern biomass and marine energy – will triple between 2008 and 2035, with its share in total global energy demand increasing from 7 percent to 14 percent[59]. Numerous factors, most notably the oil price, could alter these forecasts, and it should be noted that the figures above reflect the main scenario.

Environmental economics

In other words, differently envisaged futures are possible. In a 2011 report, the World Wildlife Fund (WWF) and energy consultancy Ecofys[60] notes that '...total energy demand could be 15 percent lower than in 2005 due to ambitious energy saving measures even though population, industrial output, freight and travel will increase.' It estimates that 95 percent of global energy demand could be met by renewables by 2050 if a number of steps are taken in conjunction with investment.

For a start, building heating needs to be cut by at least 60 percent through energy efficiency, the use of solar power and geothermal heat. Electricity grids need to be upgraded, smart grids installed and electric transport introduced on a large scale globally, whilst consumption of meat should be halved per person by 2050 in industrialized countries. Meat requires more base food calories – grains – to generate a calorie for human consumption than a vegetarian diet. As rising global populations become wealthier they are consuming more meat. €4 trillion ($5,588 billion) could be saved annually under a low carbon future but the price of this investment appears high – growing to €3.5 trillion a year over the next 25 years from €1 trillion today.

Europe will need to spend €2.9 trillion or 25 percent of the bloc's annual gross domestic product over the next 10 years to satisfy demand for low-carbon technologies, a report by Accenture and Barclays Capital (2011) notes. It is unlikely, according to The Pew Charitable Trusts that this figure will appear for Europe alone. It notes that private investments in G-20 (global top twenty economies) clean power projects could
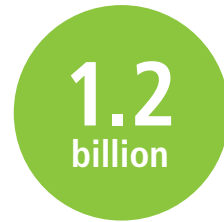
30%

China and India total world energy
consumption in 2035

€2.9 trillion

Amount needed to be spent by Europe
to satisfy demand for low-carbon technologies

1.2 billion

Amount of people still
without electricity by 2030

total $2.3 trillion by the end of the decade, with demand and policies being driven by investment in Asia, led by China and India[61].

Cleantech

If the avowed goal of climate change aversion, or at least mitigation,

> Global cleantech needs $46 trillion investment

is to be achieved, signs of this level of investment in the years to 2020 are critical. As the IEA (2010)[62] report notes, the clean technology revolution will require an additional $46 trillion investment (beyond energy infrastructure investment) if we intend to halve carbon emissions by 2050 (from 2005 levels).

Cost

To stabilise the amount of carbon dioxide in the atmosphere at 450 parts per million (ppm), which was the target set by the United Nations' Intergovernmental Panel on Climate Change (IPCC), will cost $542 billion per year, every year till 2030, according to the World Energy Outlook (WEO).

The EU estimates it at about half that cost, or about $224 billion per year. A research group called New Energy Finance sides with the WEO, putting the price tag at $515 billion dollars a year[63]. However, it is widely forecast that even if all anthropogenic greenhouse gas emissions were to be halted immediately, the past rate of emission production and the delayed impact of such, has already locked the planet into a 1.4 degrees Celsius rise[64], which suggests that it would be wiser to

proportion some capital to mitigating the effects of climate change in addition to fighting to halt even higher average temperature rises.

Access to Energy

> 1.2 billion people, equivalent to China's population, will still not have electricity by 2030

Somewhat paradoxically a large minority of the global population still doesn't have access to electricity. It would cost a comparatively small $36 billion per year to enable the world's 1 billion energy-starved people to access energy supplies at home by 2030, notes IEA. Some 1.2 billion people, equivalent to China's population, will still not have electricity by 2030 if global governments made no change to existing policies, down from 1.4 billion currently[65].
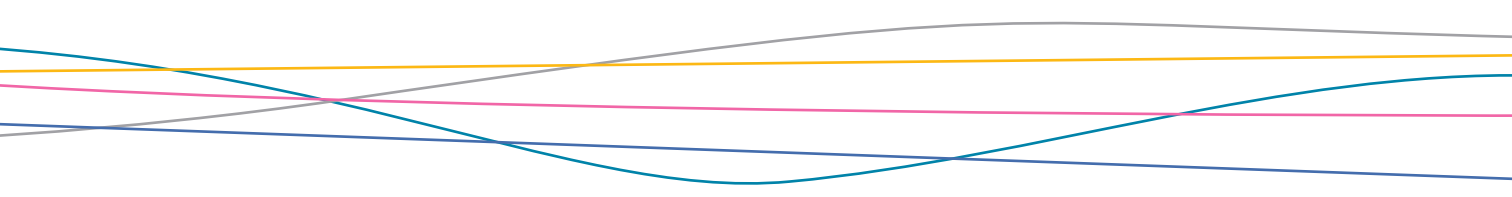
IMPLICATIONS

→ Over use of the Earth's resources will force change on us, we're already locked into 1.4 degrees of increased global temperature whatever we do.

→ Energy generation, access, cost and usage will become critical points of focus and increasingly commercial issues.

→ Waste and recycling will become critical issues as we move to 70% of the world's population living in cities.

→ Meat consumption, at present levels, in developed countries will become increasingly hard to sustain.

Biocapacity and waste

Regardless of direct climate change impacts, there remains a serious environmental challenge. An estimated 60 percent of the Earth's ecosystems have been degraded in the past 50 years and natural resource consumption is expected to rise to 170 percent of the Earth's bio-capacity by 2040 according to the World Business Council for Sustainable Development[66]. Part of the reason is that global waste production has increased 50 percent in 20 years[67] and is predicted to double again by 2030. Increasing urbanisation, rising per capita incomes and a booming global population together suggests more waste. Professor Ian Williams of the University of Southampton suggests this will lead to a doubling of global waste generation. He states that each European produces over 500kg of domestic waste per year, whilst industrial waste disposal in developed countries totals some $150 billion a year[68]. Despite improvements and scientific potential, much of the coming population growth in cities worldwide is to occur in the developing world, which is still short of such widely applicable solutions.

Global waste production has increased 50% in 20 years

The UN, in February 2010, stated that global e-waste is set to increase by 40 million tonnes per year[69]. It should also be noted that at present however, only 10 percent of all total global waste products are recycled in the world[70].

Recycling

It is estimated that roughly 15 percent of Indian consumers recycle[71] whilst the Department for Environment, Food and Rural Affairs (Defra) in the UK, notes that more than 40 percent of England's household waste was recycled, reused or composted in 2010[72].

The EU is targeting 50 percent by 2020; whilst a Friends of the Earth study (2011) claims that a 70 percent goal could lead to the creation of at least 500,000 new jobs[73]. The group also suggests that '...by recycling materials the EU currently buries or burns, the equivalent of 148 million tonnes of climate changing emissions would be saved: comparable to taking almost 50 million cars off the road.'

Only 10% of global waste is recycled
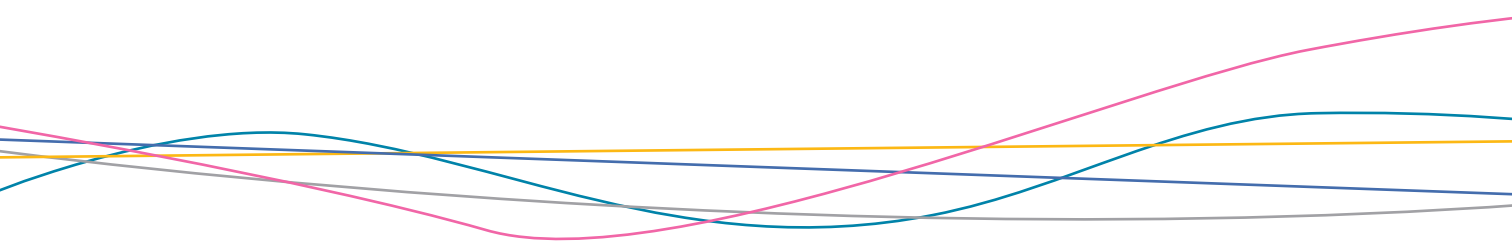
Business models

Much has happened in the past two years to shake the historical assumptions underpinning business and business models. The global economic meltdown is first and foremost of these changes, which has combined with issues surrounding global climate change, the price of oil and supply chains, even talent[74]. The result, in short, has been a sea change, against which Chief Executives (CEO's) have seized upon creativity as the necessary life raft for their organisations.

Creativity and innovation

According to a 2011 survey of 1,500 chief executives conducted by IBM's Institute for Business Value, CEOs identify 'creativity' as the most important leadership competency for the successful enterprise of the future. The study also states that '...CEOs who select creativity as a leading competency are far more likely to pursue innovation through business model change. In keeping with their view of accelerating complexity, they are breaking with traditional strategy-planning cycles in favour of continuous, rapid-fire shifts and adjustments to their business models.'

> CEOs who select creativity as a leading competency are far more likely to pursue innovation through business model change

Collaborative work and social networking

Although business models differ greatly from industry to industry, there are some commonalities underpinning emerging success. Financial outperformers are 57 percent more likely than underperformers to use collaborative and social networking tools to enable global teams to work more effectively together[75].' Indeed the notion of dispersed teams looks set to rise, with important implications for business models. Gartner (global technology analysts) suggests that 'non-routine' activities that cannot be automated, such as innovation, leadership and sales, will dominate employment, and that by 2015, 40 percent or more of an organization's work will be 'non-routine', up from 25 percent in 2010. This suggests ample room for more outsourcing. Gartner also suggests that ad-hoc groups or 'work swarms', with no previous experience of working with each other, will become a commonplace team structure. Groups of individuals, often but not necessarily geographically distant, will come together to form temporary or recurring project teams under this potential new model[76].

> financial outperformers are 57% more likely than underperformers to use collaborative and social networking tools

Resistance to the networked company

Management orthodoxies still prevent most companies from leveraging talent beyond full-time employees who are tied to existing organisational structures, which limits the organisations ability to tackle increasingly complex challenges. Pilot programs that connect individuals across organisational boundaries are a good way to experiment with new models, but incentive structures must be overhauled and role models established to make these programs succeed.

> Pilot programs that connect individuals across organisational boundaries are a good way to experiment with new models

Engaging outside knowledge and know-how

In the longer term, networked organizations will focus on the orchestration of tasks rather than the 'ownership' of workers. Open innovation is one such example, with P&G's Connect and Develop programme proving their world class open innovation capability. P&G have more PhD qualified personnel than most, yet are not afraid to partner externally where beneficial. For example: P&G is working in partnership with Brazilian company, Braskem SA, to use a renewable, sustainable, sugarcane-derived plastic for packaging, citing deficiencies in their own expertise in this area[77].

40%

Amount of 'non-routine' work
for organisations in 2010

11th

Ukraine's ranking in the top 20 leading countries
for IT outsourcing and Hi-Tech services

80%

Increase in new accounts
from a crowdsourced project

Near-shoring

P&G have more PhD qualified personnel than most, yet are not afraid to partner externally where beneficial

Emerging markets hold more potential than through partnership and collaboration alone. Near-shoring presents an advantage to fringe economies – those outside the European Union may hold a particular advantage here. According to the 2010 Global Services 100[78] list, '...Ukraine is 11th and Belarus is 13th among the top twenty leading countries in the area of IT Outsourcing and Hi-Tech services with Ukraine representing the region's biggest IT outsourcing professionals market with 11,000 professionals involved.'

Crowdsourced innovation

An area of emerging interest is crowdsourcing – outsourcing a project to a group of people. InterContinental Hotels Group (IHG) has a credit card connected to its loyalty program issued by Chase Bank. In the spring of 2009, IHG and Chase planned to relaunch[79] 'the Priority Club' Select Visa and wanted more conversational feedback and insight into new card features than traditional market research could provide. Using 'Communispace', a provider of private online communities, it sourced a pool of 300 then current Priority Club Visa cardholders willing to share their opinions on what card benefits and services are important. After the crowdsourcing project concluded, Chase and IHG promoted the card through multiple channels. The initial email campaign for the new product yielded an 80 percent increase in new accounts when compared to the previous 2010 email campaign for the legacy card product. Chase and IHG also saw a 53 percent lift in the response rates from existing customers opting to upgrade to the new card.

Business models

26%

Employees admitting to spending more than an hour a day on social networking sites

$1.3 billion

White label social networks based within companies worth in 2013

7,000

Transactions per day by EKO, allowing migrant workers to do their banking via cell-phones

Employee driven technology

The adoption of new technology is a global phenomenon, and the intensity of its usage is particularly impressive in emerging markets where relatively few legacy technologies exist vis-à-vis developed economies'

> Disruptive business models tend to arise when technology combines with extreme market conditions, such as customer demand for very low price points, poor infrastructure, hard-to-access suppliers, and low cost curves for talent

organisations. Disruptive business models tend to arise when technology combines with extreme market conditions, such as customer demand for very low price points, poor infrastructure, hard-to-access suppliers, and low cost curves for talent. Technology use is increasingly employee driven. A joint UK/US study of 2010 revealing that 26 percent of employees admitting to spending more than an hour a day on social networking sites[80]. Harnessed correctly, social networks could empower employees through facilitating knowledge transfer. Interestingly, several white label social networks are appearing within companies as a response to employee use. ABI (industry analysts) forecasts that the market will be worth nearly $1.3 billion in 2013[81].

New entrant competitors

Emerging economy competitors are now appearing en masse, with offerings ranging from a low-cost bespoke tutoring service to the remote monitoring of sophisticated air-conditioning systems around the world. For most global incumbents, these represent a new type of competitor:

they are not only challenging the dominant players' growth plans in developing markets but also exporting their extreme models to developed economies. To respond, '...global players must plug into the local networks of entrepreneurs, fast-growing businesses, suppliers, investors, and influencers spawning such disruptions,' suggests McKinsey[82]. Reverse innovation has been one adjustment made by global players, with companies such as General Electric (GE), locating research centres in these cauldrons of creativity to spur their own innovations there. 'Others, such as Philips and SAP, are now investing in local companies to nurture new, innovative products for export that complement their core businesses,[83]'.

> A new generation of start-ups, many from India, are poised to disrupt established business models

New York Times columnist Thomas Friedman believes a new generation of start-ups are poised to disrupt established business models[84]. EKO, the Indian fast-growing financial services company, uses cell-phones, software, and text messaging to allow migrant workers without access to traditional banking to transfer funds and save money – a low-cost answer to an entrenched problem. In just 18 months, the company has 180,000 users doing 7,000 transactions a day and is already turning a profit. 'In the next decade we will see some really disruptive business models coming out of here – to a neighbourhood near you. If you thought the rate of change was fast thanks to the garage innovators of Silicon Valley, wait until the garages of Delhi, Mumbai and Bangalore get fully up to speed[85].'

Corporate social responsibility comes as standard

In many cases emerging business models are just as 'modern' as those in the west. Corporate social responsibility, or CSR, is built into the foundations of many emerging market organisations for example. Sixty-five percent of the profits of the Tata Group companies go to charities, whilst tech group Infosys has built and staffed entire hospitals in different regions of the country, rolling out a national curriculum to develop IT skills at the same time. Dr. Reddy's, the Indian £1.5bn pharmaceutical corporation, provides for the health care needs for 40,000 children[86]. Not only is this smart business sense, given the swathes of Indian poor set to take the road to middle class status (and consumer spending) in the next decade, but, as Harvard Business Review notes, the creation of a powerful social mission drives employee performance – a key part of organisational success. To an extent the financial and economic meltdown of 2008 has helped solidify already established trends regarding a broken down contract between employee and employer. A business model with wider purpose inbuilt could well be a key differentiator for attracting talent and of ensuring lower staff turnover.

> 65% of the profits of the Tata Group companies go to charities, whilst tech group Infosys has built and staffed entire hospitals in different regions of the country

Cloud and mashups

In addition, the emergence of the Cloud and mashups has the potential to further erode traditional barriers delineating one business model form another.

Ettienne Reinecke, Chief Technology Officer at Dimension Data (South Africa) says cloud computing is "a total watershed moment" for the IT industry[87] "It's an interesting one. To me when I reflect on it and start analysing it, it's held up to be pretty simple for enterprise or the user. It's very much driven by a utility-based consumption model, it's very attractive from a financial construct perspective, and the simplicity that's held up is again very attractive.

To make it simple you have to hide the complexity somewhere. And that complexity I think is underestimated today. It's disruptive, it will change business models in the IT sector, it will change business models across many sectors. It has significant potential, but it's not a project, it's a journey that people have to undertake, and undertake with care. To me it's not just a technology model; it's the IT sector for the first time experiencing a disruptive consumption model of technology. There's no doubt to me it's a total watershed for our industry as we go into the future[88]." In fact cloud computing will have major implications for almost all industries, from issues regarding talent needs to freeing up technology budgets to service true customer interaction. Clearly the potential exists for a wave of outsourced business models built on the cloud. Might knowledge work be the next industry to be off-shored?

IMPLICATIONS

→ Social networks and other new communication mediums are vital in facilitating intra and inter organisation-wide knowledge sharing as organisations engage with more outside firms and individuals.

→ Incorporating 'purpose' into the business increases employee engagement and productivity, and trust by increasingly powerful consumers and other stakeholders.

→ 'Outsourcing' IT to employees will increasingly benefit organisations, as staff buy and maintain their own technology for work increasing the need to balance trust and security.

→ The Cloud offers simplicity to the user and supports new business models but providers will need to hide from view the complexity inherent in offering these services.

Complexity

One of the stated goals is the reduction of complexity in an organisation. Some complexity is beneficial to customers, and ultimately to organisations – for example offering personalisation in financial products. A KPMG study of January 2011 found that complexity is global – reaching across both mature and developing markets, as well as across industry sectors. Furthermore, complexity is increasing – three quarters of respondents in the KPMG study said complexity has increased for their organisations over the past two years, and a majority expect things to become even more complicated in the coming two years. To compound the issues, complexity is not static – about half of respondents expect the causes of complexity to shift over the next two years, and a majority say their companies will need to take different or additional actions to manage complexity[89]. Increased risk is the single greatest problem associated with increasing complexity although complexity is not necessarily bad – AT Kearney notes that '...the focus should be on determining the right level of complexity[90].' Next generation business models also need to address fluctuating levels of trust amongst the public.

> The potential exists for a wave of outsourced business models built on the cloud. Might knowledge work be the next industry to be off-shored?

Consumer power

The internet has enabled consumers to chat, shop, share, pay and consume in ways not possible previously. With the growing influence of the internet, consumers are no longer just passive recipients of marketing messages. They are out there creating messages and content and in-turn influencing other customers. One of the factors that differentiate the internet from other media channels is interactivity. Using the interactive component of the internet, consumers are gaining control not offered by traditional channels and are able to ignore, resist or even adapt to the smartest marketing campaigns. This consumer power has increased multifold with the dawn of the digital age and is set to increase dramatically as we move from 1.7 billion to 5 billion people interacting on the internet, a 300 percent increase in global economic activity in 40 years, the increasing economic activity taking place online and in many cases through deliberate government policy[91].

> Increased risk is the single greatest problem associated with increasing complexity

Trust

Edelman, in its annual trust barometer of 2011 states that 'At 56 percent globally, business is more trusted than government or media (at 52 and 47 percent respectively[92]). That is 2 percent higher than in 2010 and 18 percent higher than in 2009. Brazil, India and China hold high levels of trust in business, at 81 percent, 70 percent and 61 percent respectively. France (48 percent), the US (46 percent), UK (42 percent) and Russia (41 percent) are the most notable 'distrusters' of business.

Technology
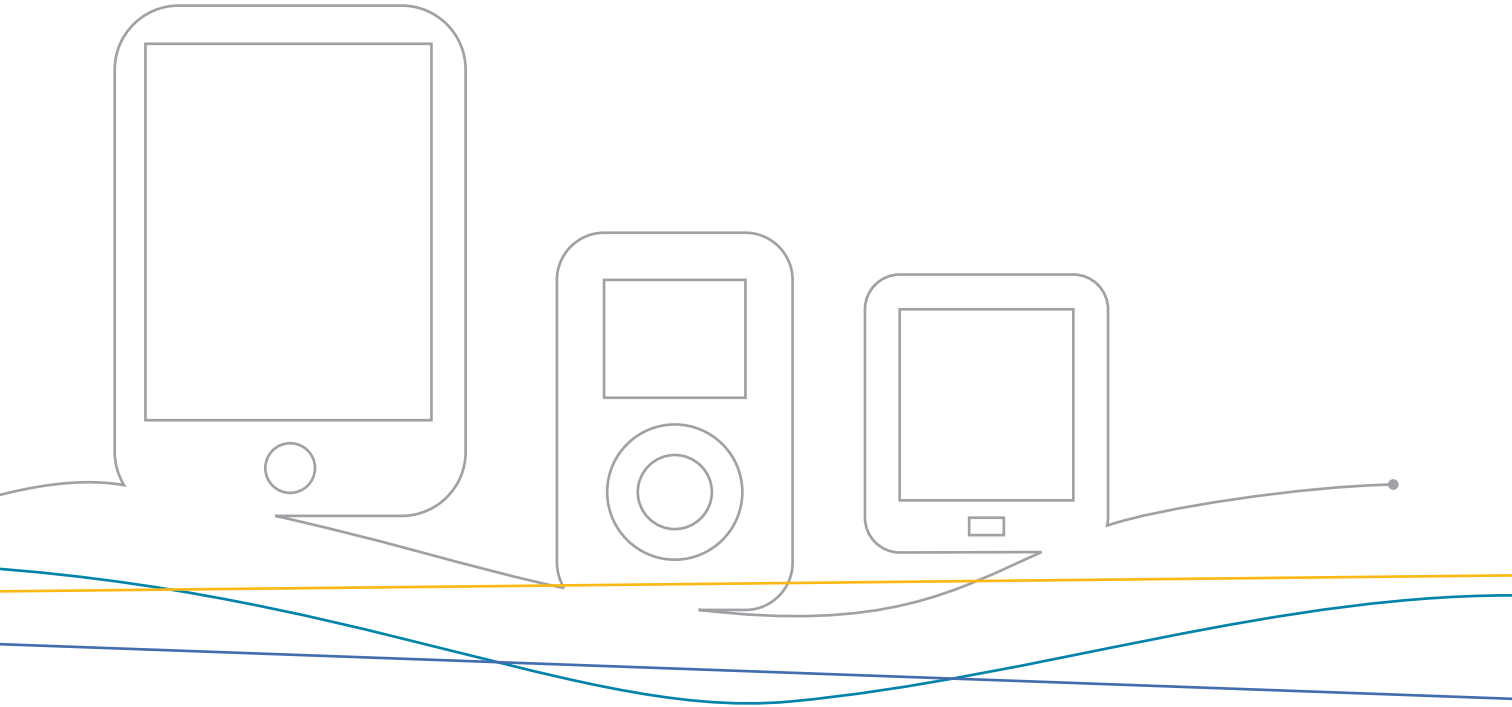
The future of communications technology promises to be more mobile, social and virtual. It will also be an era of continued technological convergence.

Online

> By 2020, the number of internet users will reach almost 5 billion – equal to the entire world's population circa 1987. This compares with 1.7 billion users in 2010

By 2020, the number of internet users will reach almost 5 billion – equal to the entire world's population circa 1987. This compares with 1.7 billion users in 2010 and only 360 million in 2000.

Vast numbers of people in developing countries will gain access to the web, thanks to a combination of plummeting costs and exponential improvements in technology. This will include laptops that can be bought for only a few tens of dollars, together with explosive growth in the use of mobile broadband. Even some of the most remote populations on earth will gain access to the internet[93].

Smartphone – gadget

The uptake of the smartphone is one such example of this convergence and the growth of the market has been rapid. In the three years since the iPhone launched, the global smartphone market is already larger than the PC market. IDC (information technology analysts)[94] in February 2011 announced that 101 million smartphones were sold in Q4 2010, versus 92 million PCs. Smartphone shipments, meanwhile, grew 87 percent year over year, while PCs only grew 3 percent.

One of the effects of smartphone use is to place a premium on a business's online offering, as well as testing its bricks and mortar pricing policies. Experian (UK) (a financial data provider) has stated (March 2011) that one in

> In the three years since the iPhone launched, the global smartphone market is already larger than the PC market

10 shoppers said they use their mobiles in stores to search for better prices online. Only 12 percent of consumers surveyed said they believed a bricks-and-mortar store would offer better value than an online one[95]. Depending on the category of item being purchased, between 80 and 90 percent said the internet has an influence on their purchasing decisions. Smartphone use goes beyond business-to-consumer (b2c) issues though – 48 percent of UK small and medium sized enterprises (SMEs) are using the devices for email tasks and basic web browsing[96].

Perhaps unsurprisingly, more entrepreneurial companies are particularly keen to tap into the mobile revolution, with 65 percent of fast-growing UK SMEs using smartphones for business purposes. As is normal for many technologies, today's competitive advantage will become tomorrow's norm, with the number of smartphones in use globally expected to hit 1.7 billion by 2014[97], driven by an explosion in purchases in emerging markets. This growth rate of 32 percent year on year until that date will ensure that over one in four handsets in use globally will be a smartphone.

5 billion

Number of internet users by 2020 – equal
to the entire world's population circa 1987

8.1%
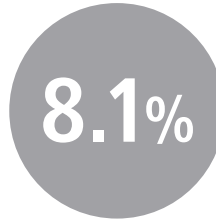
Fall in usage of Microsoft Windows
operating system in 2010

6.3%

Rise in usage of Android and Apple
operating systems in 2010

Smartphone vs PC

It's the question to ask after the bold statement made by Google's John Herlihy last year "In three years time, desktops will be irrelevant. In Japan, most research is done today on smartphones, not PCs." "Mobile makes the world's information universally accessible. Because there's more information and because it will be hard to sift through it all, that's why search will become more and more important. This will create new opportunities for new entrepreneurs to create new business models – ubiquity first, revenue later[98]."

> Windows usage declined by 8.1% in 2010. The Android, iPhone and iPad platforms gained 6.28% collectively over the same period

Windows usage declined by 8.1% in 2010. The Android, iPhone and iPad platforms gained 6.28% collectively over the same period. Given that Linux and Mac platforms were essentially static on the year, both growing less than 1 percent, it seems self-evident that as developers use more mobile platforms, they're using less Windows[99].

Mobile battery life

One of the great barriers to the even faster take-up of mobile devices has been the life of their batteries. For a great many reasons, innovation in battery performance is set to deliver significantly longer life for our computers and gadgets and even for our electric and hybrid vehicles. In the next few years mobile devices will penetrate even deeper into our personal and business lives as their always-on capability is realised through these longer life batteries[100].

Mobile storage

It is safe to assume that the exponential trends in capacity and price performance will continue. These trends have been consistent for over half a century. Even if the limits of miniaturisation are reached with current technology, formats will become available that lead to new paradigms and even higher densities. Carbon nanotubes, for example, would enable components to be arranged atom-by-atom.

The memory capacity of the human brain has been estimated at between 1 and 10 terabytes, with a most likely value of 3 terabytes. A number of high-end consumer hard drives are already becoming available at this size.

> By 2050 - if trends continue - a device the size of a micro-SD card will have storage equivalent to three times the brain capacity of the entire human race

128 GB micro-SD cards are being planned for 2011 and there is even a 2 TB specification in the pipeline. Well before the end of this decade, it is likely that micro-SD cards will exceed the storage capacity of the human brain. By 2030, a micro-SD card (or equivalent device) will have the storage capacity of 20,000 human brains. By 2043, a micro-SD card (or equivalent) will have a storage capacity of more than 500 billion gigabytes – equal to the entire contents of the internet in 2009. By 2050 – if trends continue – a device the size of a micro-SD card will have storage equivalent to three times the brain capacity of the entire human race[101].

$400 million

Social network revenue
in 2009

$1.97 billion

Social network revenue
in 2013

$18.6 billion

Virtual communication
worth by 2015

Social software

Gartner believes that as the business benefits of social software become evident, adoption of these platforms will lead to email being replaced as the primary means of communication by 2014[102]. Increased security levels and so called white label social networks, for use internally, should ensure greater usage. Early evidence again tends to support their theory that financial outperformers are 57 percent more likely than underperformers to use collaborative and social networking tools to enable global teams to work more effectively together[103]. Nevertheless, Gartner adds that '… the rigid distinction between email and social networks will erode as both become more developed. Email will take on many social attributes, such as contact brokering, while social networks will develop richer email capabilities.' However, business may be slower in understanding where the true benefits lie in the social age than placing their bets in a technology that has become its own zeitgeist. To this end it is predicted that '…only 25 per cent of businesses will routinely use social network analysis to improve performance and productivity through 2015.' Furthermore, the Gartner study adds that more than 70 percent of IT-led social media projects will fail as technology departments tend to provide an IT solution rather than a social solution that targets specific business value. The need for an integrated social media strategy aligned to business goals and of a social media literate

> An integrated social media strategy aligned to business goals and a social media literate workforce is essential

workforce is essential therefore if ROI is to live up to the hype that surrounds it. Successful commercialisation of social networks may also help business realise its potential. It is predicted that social network revenue will grow from $400 million in 2009 to $1,997 million in 2013[104].

Web influencers

Social media analysis sites such as PeerIndex and Klout have emerged, and seek to mine publicly available data from social networks, predominantly Twitter, to identify the Web's new influencers in terms of reach, peer influence, authority and amplification[105]. Seeing as each factor is measured, this could be seen as a first step to the fuller commercialisation of social networks and of individuals and of an organisations 'worth'.

Innovation

As open-source innovation and co-creation become familiar means for firms to innovate their products and service offerings the role of social media becomes more critical. Firms that have embraced these collaborative ways of surfacing new ideas understand that the greater the size and diversity of input the higher the likelihood is of imaginative and break-through innovation happening. Social networks provide the transport layer on which new ideas can flow into the organisation. Procter and Gamble built a network of over three million contributors to their product innovation process and moved from one of the lowest to one of the highest new product success rates in their industry.
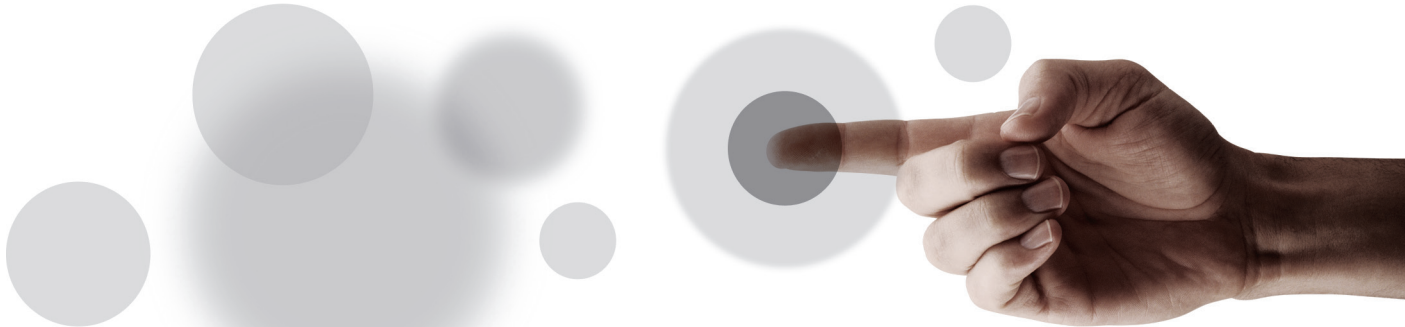
Virtual communication

There is also the probability that business communication will become increasingly virtual too. Market Media Research[106] shows that virtual meetings and events doubled in value from 2008 to 2009. The industry is expected to grow to $18.6 billion by 2015, a 56 percent annual growth rate from 2010. With the oil price set to remain high over the next decade, air travel is neither economical, nor for many companies, compatible with their corporate social responsibility (CSR) policies. In September 2009, Cisco's Global Sales Experience was virtual – and 19,000 globally dispersed employees attended. The company saved 90 percent of what the conference would have cost if it had been conducted the traditional way with hotel rooms and airline flights. Cisco, the global networking company, also saved its employees a total of 334,000 hours of travel time and kept 84,400 tons of carbon from entering the atmosphere[107]. It is unlikely given the very real need for face-to-face contact in many instances to replace meetings with virtual meetings, but used as an alternative in some situations and even in conjunction with a main event, virtual meetings look to have established a useful role in the business communication mix.

> virtual meetings and events doubled in value from 2008 to 2009. The industry is expected to grow to $18.6 billion by 2015, a 56% annual growth rate from 2010

Avatars

Scientists from Microsoft Labs have developed a prototype of an Xbox gaming avatar that you can quickly customise to look like you, sound like you, even laugh, sneer or scowl like you. Someday soon you might be able to conjure up a gaming avatar that looks and speaks like you to play Xbox Live games. It's one more small step down the path to immersive virtual-reality experiences[108].

Immersive virtual-reality worlds

People will spend a large amount of time in virtual-reality worlds in which they will compete, socialise, relax, be entertained and do business by the year 2020. British Telecom futurologist Ian Pearson says immersive computer-generated environments will give people "a life-size, 3D image and the links to your nervous system allow you to shake hands, it's like being in the other person's office. It's impossible to believe that won't be the normal way of communicating[109]."
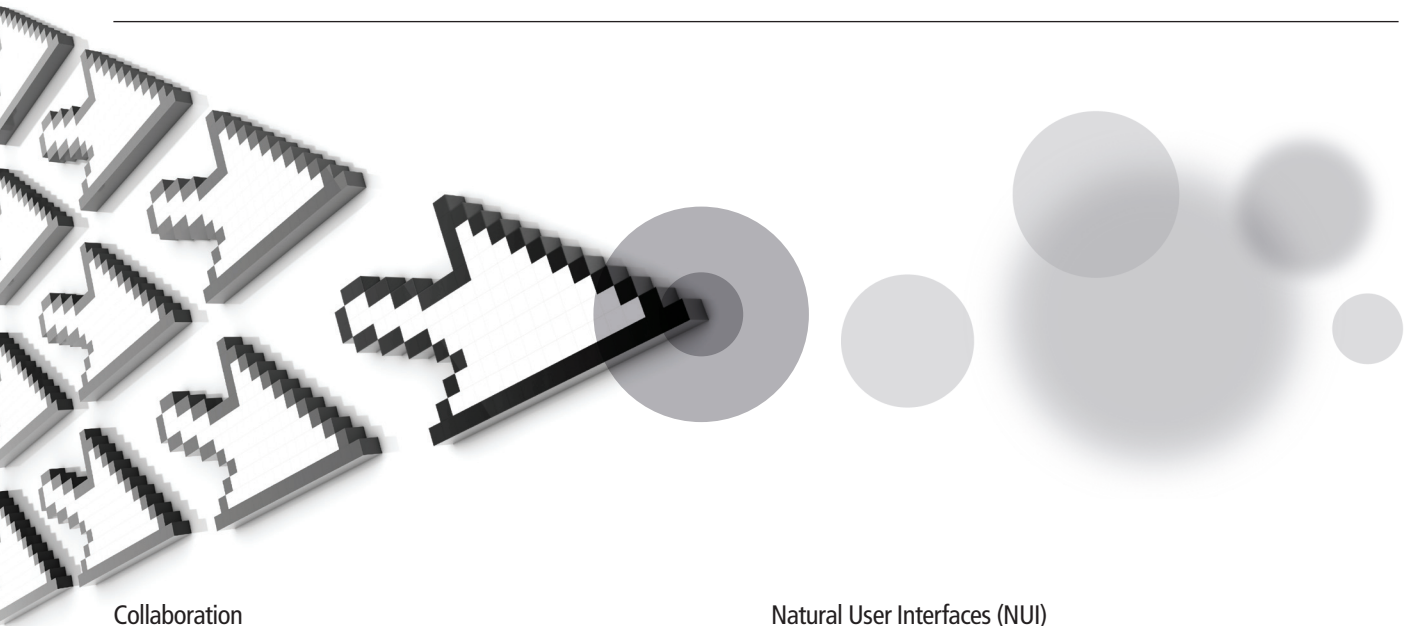
Collaboration

It is entirely possible that emerging and future technologies will seek to increase collaboration and facilitate smoother information through-flow by focusing on these three previously mentioned vehicles; social, mobile and virtual. One possible result is the evolution of the avatar/homepage used to represent the social network user. A 'touchable holograph' display has already been developed at the University of Tokyo, that adds tactile feedback to 3D images[110]. The implication of this technology goes far beyond today's social network user as it would completely define the relationship between work and space. It would, in essence, provide the physical touch lacking in distance working and e-learning, ensuring that the technology delivers more of a workers social needs that flow from their work.

> A 'touchable holograph' display has already been developed at the University of Tokyo, that adds tactile feedback to 3D images

Augmented reality

Augmented reality refers to software applications that place generated graphical, aural and textual information on top of real-life imagery. At the moment, this is mostly the realm of mobile phones such as the iPhone or Android; however, in years to come many expect that there will be optical versions available that are similar to eye-glasses or even contact lenses[111].

Natural User Interfaces (NUI)

"Microsoft is imagining a NUI future," Steve Ballmer's company describes pretty accurately the way things are going with personal technology right now: "You don't have to look very far to realise that technology is becoming more natural and intuitive," it begins. But then it notes, "In a typical day, many people use touch or speech to interact with technology, on their phones, at the ATM, at the grocery store and in their cars[112]."

Data volume

In 2009 the Digital Universe grew by 62 percent to nearly 800,000 petabytes (one petabyte equals one million gigabytes) and in 2010 the rate of growth is forecast to be almost as high, to 1.2 million petabytes, or 1.2 zettabytes.

> In 2009 the Digital Universe grew by 62% to nearly 800,000 petabytes (one petabyte equals one million gigabytes)

Extrapolating this growth means that by 2020, the Digital Universe will be 44 times as large as in 2009, whilst the growth of files will outstrip even that, at a factor of 67. By way of comparison, the number of IT professionals is forecast to grow by a factor of 1.4 whilst storage is forecast to grow by a factor of 30.

Hence, we have a growing gap between the amount of digital content being created and the amount of available digital storage. In 2009, if people had wanted to store every gigabyte of digital content created, they would have had a shortfall of around 35 percent. This gap is expected to grow to more than 60 percent (that is, more than 60 percent of the petabytes created could not be stored) over the next several years[113].

62%
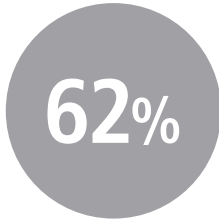
Growth rate of the digital universe
in 2009

44x

The digital universe will be
44 times larger by 2020

80%

Information that could qualify
as unstructured data

Unstructured data

Social media, the Cloud and high powered computing, might, between them, be able to deal better with unstructured data. More than 80 percent of all of information could qualify as unstructured data, resulting in partial business intelligence at best[114]. In a sense, unstructured data will need to be dealt with 'virtually' given that the sheer size of data is probably too much for a single organisations system to process.

Data regulation and analytics

Every 5.5 years we will see a tenfold rise in the amount of data that we will need to store and analyse for our business

IDC have forecast that every 5.5 years we will see a tenfold rise in the amount of data that we will need to store and analyse for our business. It also predicts that as much as 80 percent of this data could be covered by some regulatory compliance obligation. The sort of data that we are collecting is changing rapidly. In the past few decades much of the data we stored and analysed was numbers or letters. Today we record calls in our customer contact centres and are starting to regularly hold video conferencing calls with our clients, suppliers and business partners. This data will be required to be stored and will also be required to be analysed by your business intelligence system. To make sense of this vast amount of data we will need new techniques and tools in place.

Filtering the noise

Advances in data storage, transmission and processing have transformed the internet from a geek's paradise to a supporting pillar of 21st century society. But while the last 10 years have been about access to information, the next 10 will be dominated by how to make sense of it all. Without the means to find what we want in this vast sea of information, we are quite literally drowning in data. And useful as search engines like Google are, they still struggle to separate the meaningful from the meaningless. Over the next decade we will see some significant changes in how we interact with the internet. As devices like phones, cameras, projectors, TVs, computers, cars, shopping trolleys, you name it, become increasingly integrated and connected, be prepared to see rapid and radical changes in how we interface with and make sense of the web[115].

15%

The information in the digital universe
that could be part of a cloud service by 2020

22 billion

The amount of devices
communicating over the internet by 2020

11.5 billion

Expected sales of professional
and personal service robots in 2011

Data lifespan

Worries concerning data lifespan continuing to give air to subjects embarrassing to the user long after the fact are also being addressed. An app called TigerText allows text-message senders to set a time limit from one minute to 30 days after which the text disappears from the company's servers on which it is stored and therefore from the senders'

> Researchers are developing a technology called Vanish that makes electronic data 'self-destruct'

and recipients' phones. Jeffrey Rosen, a law professor at George Washington University, writing in the NY Times notes that '...expiration dates could be implemented more broadly in various ways. Researchers are developing a technology called Vanish that makes electronic data 'self-destruct,' after a specified period of time. Instead of relying on Google or any given social network to delete the data that is stored 'in the cloud', Vanish encrypts the data and then 'shatters' the encryption key. To read the data, your computer has to put the pieces of the key back together, but they erode as time passes, and after a certain point the document can no longer be read[116].'

In the Cloud

Using reasonable forecast assumptions on cloud services, it is possible to conclude that as much as 15 percent of the information in the Digital Universe in 2020 could be part of a cloud service – created in the Cloud, delivered to the Cloud, stored and manipulated in the Cloud, etc. Even more information could "pass through the Cloud," that is, be transported using a cloud services email system or shared community, be stored temporarily on disk drives in the Cloud, be secured via a cloud service, etc. By 2020, more than a third of all the information in the Digital Universe will either live in or pass through the Cloud.'

Peer-to-peer digital video

TV shows, YouTube clips, animations, and other video applications already account for more than 60 percent of internet traffic, says CacheLogic, a Cambridge, England, company. "I imagine that within two years it will be 98 percent," adds Hui Zhang, a computer scientist at Carnegie Mellon University. And that will mean slower downloads for everyone.

Zhang believes help could come from an unexpected quarter: peer-to-peer (P2P) file distribution technology. Of course, there's no better playground for piracy, and millions have used P2P networks such as Gnutella, Kazaa, and BitTorrent to help themselves to copyrighted content. But Zhang thinks this black-sheep technology can be reformed and put to work helping legitimate content owners and internet-backbone operators deliver more video without overloading the network[117].

The consumer robotics market is booming at the moment.|
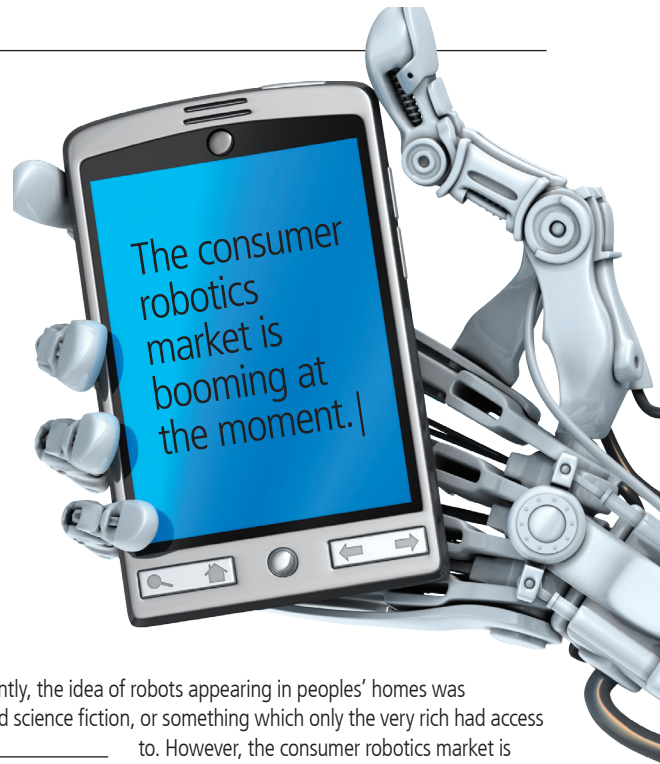
Ambient technology

By 2020 we expect to have over 22 billion devices communicating over the internet. As we will be connected to it through many devices our use of

> By 2020 we expect to have over 22 billion devices communicating over the internet

technology to communicate effectively blends into our surroundings. For example as we walk down a street it's possible for our diary to connect with a bus stop and tell us to stop right there and wait 30 seconds for the right bus to take us where we want to go. We will be able to connect with our friends, family and business associates in new, dynamic and spontaneous ways, increasing our productivity and connectedness. The issue here will be one of privacy versus utility – which is likely to be one of the most discussed and argued-over issues of the coming decade.

Artificial intelligence

Artificial intelligence will surpass human intelligence after 2020, predicts Vernor Vinge, a world-renowned pioneer in AI, who has warned about the risks and opportunities that an electronic super-intelligence would offer to mankind.

"It seems plausible that with technology we can, in the fairly near future, create (or become) creatures who surpass humans in every intellectual and creative dimension. Events beyond such an event – such a singularity – are as unimaginable to us as opera is to a flatworm." He says[118].

Robots

Until recently, the idea of robots appearing in peoples' homes was considered science fiction, or something which only the very rich had access

> Korea has a stated goal of "a robot in every home by 2020"

to. However, the consumer robotics market is booming at the moment. Thanks to falling costs, they are beginning to enter mainstream society. Sales of professional and personal service robots are expected to reach 11.5 million in 2011, more than double the number in 2008. Initially popular in Japan, Korea and the Far East, they are now spreading to Western homes too. Some robots clean carpets or mow the lawn; others help busy professionals entertain children or pets; other machines feed and bathe the elderly and incapacitated.

Korea has a stated goal of "a robot in every home by 2020," and Samsung has already developed a robot maid that "recognizes people, can turn on microwave ovens, washing machines and toasters, and also pick up sandwiches, cups and whatever else it senses as objects[119]."

The scarily realistic Geminoid F, made with help from robot maker Kokoro, looks just like a twenty-something Japanese woman. The android sports extremely realistic hair and a set of teeth which apparently enable it to produce the most realistic robot smile yet. The android is operated by remote control and can mimic the exact facial expressions and speech of its operator. All of its electronics are hidden inside the android itself, and it can be charged and powered by a standard household electricity supply.

IMPLICATIONS

→ Desktop and mobile computing operating systems vs mobile operating systems – the App world versus the online world – will be one of the most dramatic changes of technology this decade.

→ An increasingly mobile, social and virtual era of technology and IT is upon us – requiring us to learn how to use new business models and social and online analytics to stay relevant.

→ The coming data flood presents an opportunity for those with clear and effective technological and organisational tools. Third parties will provide the capacity and capability to manage this mass data.

→ As artificial intelligence and robotics develop, keeping the less skilled in work will become an increasing challenge and will increase unemployment.

→ Resource constraints mean we can't continue to develop and use technologies the way we always have – we will see breakthrough innovation in many areas.

The Japanese are used to seeing robots being implemented in day to day society; things like roadwork's in Tokyo are often decorated with simple robotic traffic conductors. The Geminoid F, however, will be used in much more complex situations. Its apparently friendly appearance makes it the perfect receptionist, and Ishiguro also believes that it would work well in hospitals, relaxing patients when nurses couldn't be there[120].

3D printing

> The latest printers launched in March 2011 can print an object up to 8 square meters in volume, the size of a small car

The ability to take designs and images direct from a computer, transmit them across the world to a printer that will fabricate a perfect replica in 3D in metal, plastic or ceramics is now with us. The latest printers launched in March 2011 can print an object up to 8 square meters in volume, the size of a small car. Expect in the future that bicycles, cars, and anything else around that size will be able to be personalised, designed to fit perfectly and meet our desire for individualism.

Resource constraints to growth

Nevertheless, the development of future technology is not as assured as the growth of Moore's law would suggest. Armin Reller, a materials chemist at the University of Augsburg in Germany, has predicted that supplies of indium, used in liquid-crystal displays, and of hafnium, a critical element for next-generation semiconductors, could be exhausted by 2017. The world's zinc will be gone by 2037 he says[121]. With this in mind, innovation in the future may increasingly focus on recovering already utilized resources and pioneering new ways of doing things, rather than purely exploiting new technologies.

Fast broadband

The UK could be at risk of being left behind in the race to provide fibre optic broadband to homes across Europe, it has been suggested. Chris Holden, president of the FTTH (fibre-to-the-home) Council Europe, said that major economies, including Germany, Spain and the UK must 'speed up' or emerging markets will overtake in regard to the growth of FTTH networks.

Denis McCauley, director of global technology research at the Economist Intelligence Unit (EIU), said that there is "broad recognition that the UK lags behind other nations in key areas of digital development", naming next-generation network roll-out and service adoption as the main problem areas. However, he added that there are many policymakers and industry experts who believe that the UK has achieved in some areas of digital development, such as making online public services available to people and businesses.

Last year the EIU reported that the UK dropped one place in the digital economy rankings, which reflects how countries maximise the use of information and communication technologies for economic and social benefit[122].
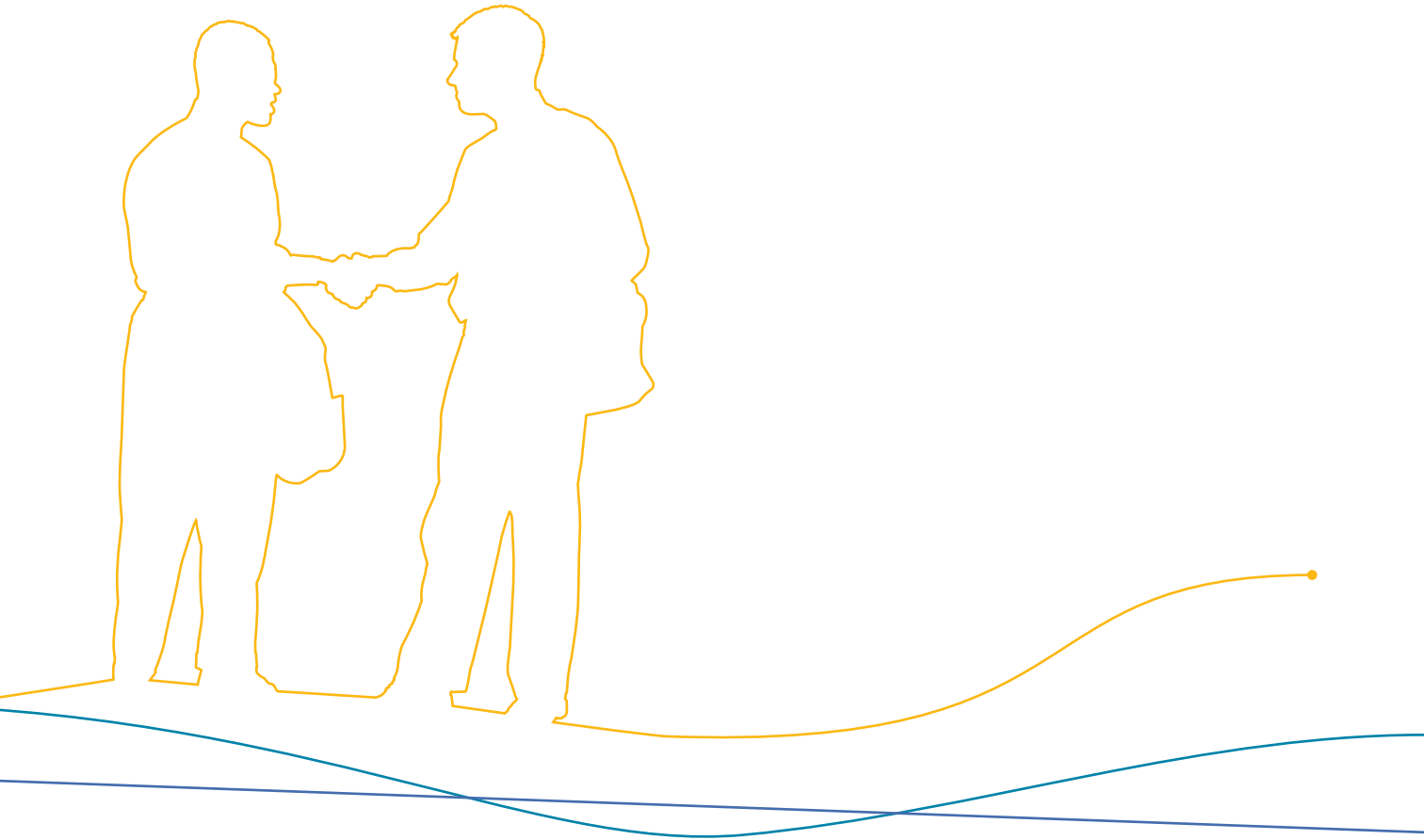
Work

Professor Lynda Gratton of the London Business School has identified five key forces that shape the world of work[123]: The first is globalisation and the migration to cities. Second she suggests that technology and the digitalisation of knowledge, alongside our connectivity, will create a global network of micro-entrepreneurs across national boundaries. In the next 10 years 5 billion people will be connected. Demographic change, giving our children 100 year life-spans, our ageing societies, the transition to a low carbon economy and of social change, as a result of all of these drivers, round out her list of drivers.

Ageing workforce

Ageing is perhaps the biggest long term issue of these, and perhaps the one that the world of work is least prepared to deal with. As of 2010 there

> The EU labour force will decline by around 68 million workers by mid century if trends persist

were 10 million people in the UK over 65 years old. The latest projections are for 5.5 million more elderly people in 20 years time and the number will have nearly doubled to around 19 million by 2050[124]. The EU labour force will decline by around 68 million workers by mid century if trends persist[125]. The EU Commission predicts that 'annual GDP growth rate' will 'decline significantly in the future,' with a smaller working age population acting as a 'drag on growth and on per capita income[126].'

Environment related jobs

Despite an overall decline in working age population, the German economy seems set to increase working numbers in a few strategic areas. As of 2009 there were 250,000 jobs in Germany's renewable energy sector.

Between 2005 and 2030, most large economies will experience stagnation noted Germany's Deputy Environment Minister Astrid Klug, but this number could triple by 2020, and hit 900,000 by 2030[127]. A total of 1.8 million people currently work in environmental protection, accounting for 4.5 percent of Germany's workforce. France seems similarly placed. According to a 2009 report by the Boston Consulting Group[128], the greening of the environment could create or keep up to 600,000 jobs by 2020.

Changing workforce

Germany and Italy will experience drops in the size of their workforce of 8 percent and 5 percent whilst the UK will experience a 2 percent increase. Owing to its young population, India is set to experience a potential dividend in the form of a 45 percent rise in working population. Clearly both rapidly expanding and shrinking working age populations present numerous challenges and opportunities, albeit of a different nature. One common issue revolves around talent, and its shortage.

Talent acquisition

In its annual May release of 2010, Manpower noted that 9 percent of UK employers are having trouble filling vacancies[129], despite an 8 percent unemployment rate in the three months to January 2011[130]. 16 percent of Indian employers report the same problem, which is compounded by the fact that a mere 25 percent of Indian graduates are considered employable (Mercer 2008[131]). Having access to the best talent continues to be a challenge for CEOs and business leaders – with 97 percent of CEOs in PwC's annual global CEO survey saying that having the right talent is the most critical factor for their business growth[132]. In addition, 79 percent of CEOs said they would be changing their strategies for managing talent as a result of the downturn – and 55 percent said they would look to change their approach to global mobility including international secondments. Work is set to become more international, aided by technological and business model evolution. PwC predict a further 50 percent growth in assignments by 2020. There will be more assignees, more business travel, and more virtual tools.

10
million
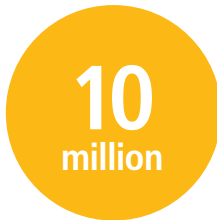
Over 65 year olds in
the UK, 2010

19
million
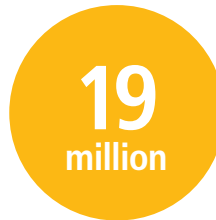
Over 65 year olds in
the UK by 2050

211%

Increase in jobs in the UK
hospitality sector by 2017

Virtual work

By 2015, 40% or more of
an organisation's work
will be 'non-routine',
up from 25% in 2010

Virtual tools will be central in ushering in a new world of work, and by necessity, the new world promises to be more flexible. Gartner suggests that 'non-routine' activities that cannot be automated, such as innovation, leadership and sales, will dominate employment, and that by 2015, 40 percent or more of an organisation's work will be 'non-routine', up from 25 percent in 2010. These increasingly non-routine tasks, it suggests, will be outsourced to geographically dispersed ad hoc teams, or 'swarms'. In effect this is the birth of the contract economy.

PwC suggests that this may mean[133] the boundary between work and home life disappearing as companies assume greater responsibility for the social welfare of their employees.

Service industries

The UK Commission for Employment and Skills (UKCES) report, based on ONS data, suggest that by 2017, the UK will see a 211 percent increase in jobs in the hospitality sector and a 214 percent increase in jobs in retailing distribution. There will be an 883 percent rise in employment for other business services – accountancy, law, consultancy, advertising and public relations – which are expected to account for more than one third of the jobs growth to 2017[134]. Mike Campbell, UKCES director of policy and research, said the research identified continued rapid growth in areas like IT, business services, financial services, care of the elderly and young people, advanced manufacturing and biotechnology.

'The government also thinks there are a number of emergent sectors,' says Mr. Campbell. 'There's nothing guaranteed, but there's a belief that the UK has a particular advantage in these sectors and if they're promoted appropriately, then they could do really well in the future.'

If the industries are to prosper, they will need to incorporate a number of changes in a small period of time. The ageing population is chief amongst these. Other factors include the desire for flexible working and the expectations of the new millennial generation.

IMPLICATIONS

→ Longer life expectancy will change our attitude to our working lives. We will increasingly live a 'gap' lifestyle – mixing work, leisure, volunteering and care duties.

→ Talent recruitment and retention will become increasingly strategic concerns as shortages and up to four generations of workers require more effort to create the right workforce mix, including more women, the aged and the disabled.

→ Work based training will rise in importance as talent mismatches and shortages occur and knowledge transfer from older workers will require conscious effort if it is to take place – at all.

→ Strategic foresight and engagement in global talent networks will help identify issues ahead of time.

Internationalisation

According to research by telecommunications staffing provider Glotel, one in six (18 percent) of those polled said they would like to take up an opportunity abroad within the next five years, while just under one in 10 (9 percent) said they would do it within 10 years. Millenials are

> Millenials are more open to overseas assignments than any previous generation and see working overseas as an important part of their own personal development

more open to overseas assignments than any previous generation and see working overseas as an important part of their own personal development. A significant majority of the millennials PwC surveyed, some 80 percent, want to work abroad, with 70 percent expecting to use non-native languages in their careers and 94 percent stating they believe they will work across geographic borders more than their parents did. Whether or not this new international set up will be realised will in part depend on Government's responses to domestic social issues. New UK government rules, for instance, will reduce the number of jobs open to non-European skilled migrants from 500,000 to 230,000 – fewer than 1 percent of the UK labour force[135].

Networked organisation

Low levels of immigration and an ageing workforce in most European nations will place knowledge management front and central in the coming decade and beyond. If indeed the future of the workplace lies in more dispersed, globally diverse teams, then it would stand to reason that knowledge silos could become a thing of the past. This will place the focus on professional networks – and of leveraging the networks of alumni who have since moved on to other projects. Rand[136] believes that the general framework for the future includes this networked economy. It also cites three other factors. Slower labour force growth will encourage employers to adopt approaches to facilitate greater labour force participation among women, the elderly, and people with disabilities. Greater emphasis will be placed on retraining and lifelong learning. Lastly, future productivity growth will support rising wages and may affect wage distribution.

New jobs

> The demographic ageing process could give rise to mass uptake of old age consultants

But what will the networked economy entail? Will a change in how we work be accompanied by what we do? Rohit Talwar in the 'Shape of Jobs to Come report' of 2010[137] notes that several trends point towards the creation of whole new markets. The demographic ageing process could give rise to mass uptake of old age consultants, whilst a revolt against wasteful industrial farming could lead to vast urban 'vertical farms,' requiring horticultural and perhaps GM expertise, notes the report. Advancements in social media and healthcare alone promise an array of new jobs and of skill modifications for those already in those industries.

Outsourcing

Gartner suggests that 'non-routine' activities that cannot be automated, such as innovation, leadership and sales, will dominate employment, and that by 2015, 40 percent or more of an organisation's work will be 'non-routine', up from 25 percent in 2010. These increasingly non-routine tasks, it suggests, will be outsourced to geographically dispersed ad hoc teams, or 'swarms.' In effect this is the birth of the contract economy, where an agile company core uses outsourcing to reduce costs, increase expertise and allow organisational flexibility.

Cost reduction

Whether or not this new world of work materialises, outsourcing in the more narrow and familiar sense that is common in present day business, looks set to strengthen tremendously as a global market. Within the Global Data Centre Outsourcing market, one of the key factors is decreasing cost, thanks to the rise of cloud computing. TechNavio's analysts forecast[138] that the Global Data Center Outsourcing market will reach $163 billion in 2014. The cost savings of cloud computing are considerable. With major providers offering desktop deals in the range of $35 - $75 per head, companies will find their existing deals of $300 - $1,000 per head difficult to defend notes Morrison & Foerster (2010[139]).

Information Technology – Business Process Outsourcing

Changing demographics, increasing affluence and economic growth in Asia/ Pacific continues to drive shared services and BPO adoption, especially in Australia, India, Southeast Asia and China

The National Association of Software & Services Companies (Nasscom), the apex body of India's information technology and business process outsourcing sectors (IT-BPO (Information Technology – Business Process Outsourcing)), stated in February 2011 that India's share in the global outsourcing market rose to 55 percent in 2010 from 51 percent in 2009[140]. The industry body expects the IT-BPO sector revenue to grow 19 percent to $76 billion and estimated sector's revenue to be 6.4 percent of the national GDP in 2011. Nasscom said it expects the BPO export market to grow 14 percent to touch $14.1 billion helped by adoption of technology across government, corporate and small and medium businesses.

'Changing demographics, increasing affluence and economic growth in Asia/Pacific continues to drive shared services and BPO adoption, especially in Australia, India, Southeast Asia and China,' T.J. Singh, research director at Gartner, notes[141]. 'There is growing demand for multi-country shared services and BPO services within Asia/Pacific. Buyers continue to invest in services that deliver scalable, high quality and consistent services across their geographical presence.'

A.T. Kearney's Global Services Location Index 2010[142] finds that wage changes and currency shifts from the financial crisis have led to major changes in outsourcing global rankings. The UK, for example, has been able to benefit from a sharp drop in wages, and climbed to 16th in the ratings from 31st in 2009. Nevertheless the trend towards Asian-based outsourcing seems assured. Dr. Ganesh Natarajan, vice chairman and chief executive of India's Zensar Technologies[143] forecasts global outsourcing to reach $1.3 trillion by 2020, with Asia capturing between 80 and 85 percent of the total market by that date.

The remaining 15 to 20 percent of the market would be shared by Europe, Latin America and other countries. Interestingly in 2010, Morrison & Foerster note that by one key measure – the volume of outsourcing spending by international firms – Europe is now a bigger outsourcing market than North America. But recovery from recession is predicted to be slower in Europe than elsewhere thanks to structural issues and the ongoing fragility of the Euro. This may erode Europe's lead as new outsourcing deal signings are slow to come on-stream.

$1.3 trillion

Global outsourcing
to grow to this by 2020

>80%
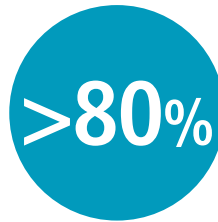
Amount Asia will capture
of global outsourcing by 2020

>15%

Amount Europe, Latin America & other countries
will capture of global outsourcing by 2020

Research and Development (R&D)

> Outsourcing will continue
> to deepen in scope to
> include R&D. Powerful
> verticals could be
> established

Perhaps one of the more overlooked drivers in the accentuation of the outsourcing market value by 2020 is that of higher end work. No longer is outsourcing confined to call centre type work, but as technological advantage converges globally, India and others appear well set to develop high end research and development (R&D) outsourcing functions. Going forward, India's Engineering Research & Development (ER&D) providers have the potential to capture a 40 percent share of global offshore revenues in 11 key verticals by 2020 according to a 2010 Booz study. 'India is the only country in the world to offer a large third-party engineering vendor base,' according to Sunil Sachan, Principal, Booz & Company (a management consulting firm)[144].

Strategic Partners

Nasscom President Som Mittal notes that, '...due to the growing sophistication of the ER&D services industry, customers have begun to view service providers as strategic partners. India is now an epicentre for global ER&D services with a compelling value proposition.' In this sense outsourcing could well be seen as a strategic industry in the future by economies, and the first step towards the development of strongly aligned vertical industries. Increasing investment in ER&D, has the potential to transform India into an engineering powerhouse over the next decade with the potential to create more than five million jobs.

The Booz study also details anticipated changes in the ER&D landscape in 2020, compared to the current day. Key global drivers of change include a shift in centres of economic activity, notably the emergence of Asia, demographic challenges in mature economies, greater technology convergence and major shifts in industry structures.

> ER&D, has the potential
> to transform India into an
> engineering powerhouse
> over the next decade
> with the potential to
> create more than five
> million jobs

Concurrent growth in the Indian domestic market, infrastructure investments by the Indian government, and offset policies are expected to drive growth in the domestic Indian ER&D services outsourcing industry. Indeed domestic demand is expected to contribute between 10 and 15 percent of the Indian ER&D market in 2020, with European demand adding another 30 percent. In a sign of changing times, the US market is only expected to provide 45 percent of total ER&D service revenue in 2020, down from 62 percent in 2009. Clearly businesses and policy makers alike will have to contend with an ever more competitive and dynamic global marketplace.

IMPLICATIONS

→ Outsourcing service providers will be required to address highly geographically dispersed and increasingly virtual organisations with adaptable, out-of-the-box solutions.

→ Outsourcing of knowledge based work will increase and the size of the outsourcing service provider will become smaller and more niche, at the same time as global service providers will increase in size.

→ Huge potential for growth in the 'Far East' due to vast populations and a commitment to education - but as costs rise expect new – 'Next 11' economies to become increasingly important and 'Old World' economies become more competitive.

→ As Research and Development is increasingly outsourced - outsourcing firms will be seen as strategic partners.

The Future

Businesses have become larger and more global and increasingly virtual and this trend is set to continue, even accelerate. Outsourcing of IT assets and processes and the people who run them is a dying model. Outsourcing customers are looking for more agile, less expensive and lower commitments to vendors and simply want to consume the processing and IT power it needs, when it needs it. They aren't going to be looking to acquire new assets any time soon, they don't want the obligations of ownership and management of IT assets they simply want to use IT services to prosecute their business plan.

> Providers will need to provide solutions-in-a-box for their customers to plug into their business model

A new market will need to develop where service providers are engaged to meet the needs of the clients business rather than support the IT that meets their needs. It will mean increasingly direct support of a clients business goals, at the point where the activity takes place, rather than underpinning technology that provides a platform for the software to be deployed, that in turn, supports the business. Providers will need to provide solutions-in-a-box for their customers to plug into their business model. These solutions will need to be highly adaptable and built as components that can be assembled with other solutions and other providers solutions for rapid deployment.

New entrants providing innovative back office and vertical solutions are entering the market leaving many traditional outsourcing firms struggling with their less adaptable business model[145].

Regulation and legislation
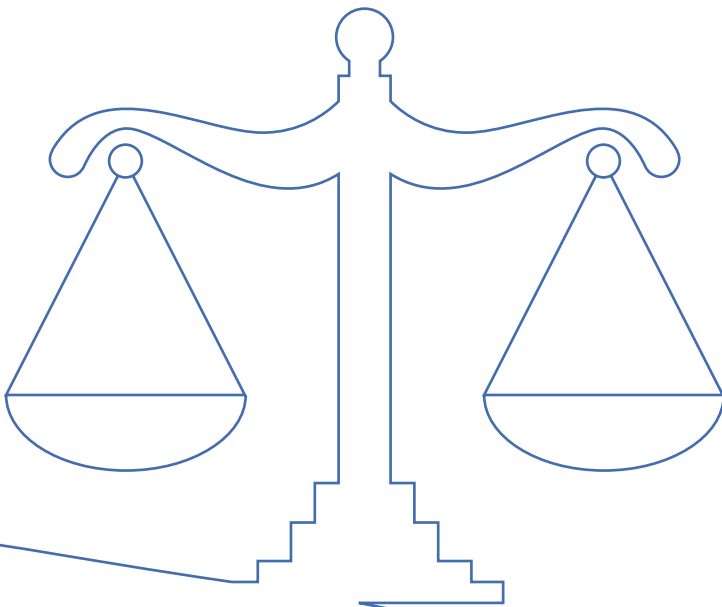
Ageing and environmental laws are likely to shape much future
regulation and legislation at least within the European Union.

Retirement

The phasing out of the compulsory retirement age in the UK will commence
in April 2011[146]. If an employer seeks to retire an employee, who only
reaches retirement age after 30 September 2011, they risk a claim of age
discrimination unless they can provide objective justification for retirement
at that age.

> Average retirement age
> in the 27-nation bloc (EU)
> would have to increase
> from the current age of
> 60 to 70 by 2060

Under the current timetable, the state pension
age will rise to 66 by 2026, 67 by 2036 and
68 by 2046[147]. Overall these moves should
have a net benefit for organisations in the
form of retention of tacit knowledge and
willing and able workers. Whether or not this
will be able to make up for a predicted shortfall in skilled migrants is
difficult to say. New UK government rules will halve the number of jobs
open to non-European skilled migrants. Given the role of networks and
of open innovation crossing borders, this may not be a critical issue, but
one that no doubt, will impact different industries in different ways.

The European Union faces similar issues with regards to ageing, if not
immigration. The European Commission has stated the average retirement
age in the 27-nation bloc would have to increase from the current age of
60 to 70 by 2060 if workers are to continue supporting retirees at current
rates[148]. EU Employment Commissioner Laszlo Andor believes it is urgent for
Europe to act now because its working age population will start to shrink
from 2012.

Stress at work

The European Commission (2011)[149] '...has published an evaluation of
the agreement to ensure a minimum level of protection against stress at
work, concluding that it has had positive effects where implemented.'

'Over the last 10 years, work-related stress has increased in nine Member
States and has only fallen in Sweden. Studies suggest that between 50
percent and 60 percent of all lost working days are related to stress. In
France for example, the cost of stress has been reported to reach at least
€2 to €3 billion each year. In the UK it's estimated that 10 million working
days are lost due to anxiety, stress and depression linked to work. The
direct costs related to stress at work are now estimated to be as high
as 4 percent of EU GDP.' A deepening of this law may be possible.

68

UK state pension age
by 2046

10
million
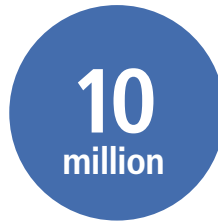
Days lost due to anxiety
in the UK every year

$607
billion

Green buildings market
worth in 2015

Environment

Absent a trade war or implosion of the European project, the other major issue that looks set to drive regulation is that of climate change and the environment. Potential EU legislation centred on the construction of new buildings and allowance of carbon emissions per member state have become major issues[150]. New energy standards for example require all new buildings constructed in Europe after 2020 to be nearly carbon-neutral[151], whilst a gradual move to car free (petroleum using vehicles) cities in 2050 has been targeted[152]. Critics have pointed out that the cost of implementing these targets, together with any ensuing loss of competitiveness will ultimately damage the economy, whilst proponents point to the potentially huge markets that the EU could possibly lead in, such as, the green buildings market which is expected to be worth $606.8 billion globally by 2015[153].

> The green buildings market which is expected to be worth $606.8 billion globally by 2015

With its distinct demographic advantage and (currently) low carbon footprint, especially on a per capita basis, impactful Indian legislation is likely in other areas. Capital market regulator the Securities and Exchange Board of India (Sebi) plans to regulate outsourcing by market intermediaries to prevent systemic risk and protect investor interest.

Operational, reputational, legal and systemic risk

'Outsourcing raises a variety of concerns both for the regulator and the outsourcing intermediary. There are several risks associated with outsourcing such as operational, reputational and legal risks. There is also concentration and systemic risk, if a large number of market intermediaries rely upon one, or a few, third parties for the same activity,' the regulator noted in January 2011.

IMPLICATIONS

➔ Climate change legislation will impact all businesses, particularly those in Europe.

➔ Energy and debt will remain important influencers of government policy for the coming decade.

➔ With less new foreign talent and more older workers, retraining and continuous learning will be at a premium and retirement policy will change dynamically.

➔ Regulation will seek to reduce risk in outsourcing being concentrated in too few organisations.
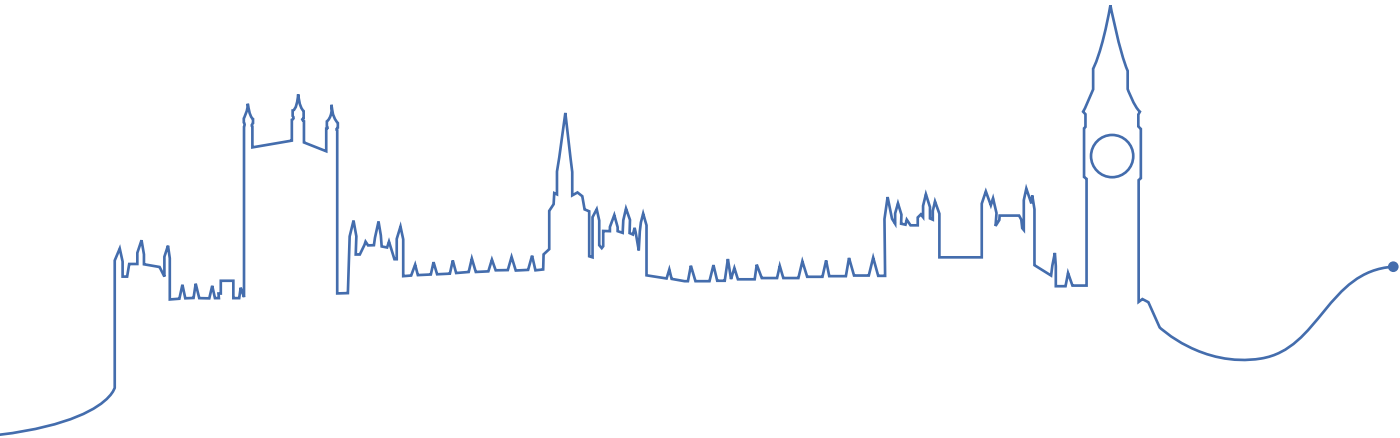
Government

Nenad Pacek, an economist regarded as one of the world's leading authorities on emerging markets, believes that countries with public debt of 60 percent or more of GDP are inevitably forced into 'deleveraging,' by raising taxes and cutting government spending[154]. The combination ultimately depresses economic activity. Public debt by 2020 is expected to hit 131 percent in Italy, 124 percent in the UK, 114 percent in France and 97 percent in Germany[155]. Policy makers in these countries face an uncomfortable decision – dealing with these debts at once risks social unrest and a sharp economic contraction, whilst leaving it alone places a structural constraint on future growth. Higher debt and taxation together with reduced welfare and overall governmental spending seems a given, with differences between countries probably only in the specific details. The question all are facing is how to do more with less.

Balancing the books

Defence, at least in the UK, is one area struggling to balance its international commitment with domestic funding, as shown in the Libyan intervention. Total worldwide military spending in 2010 was $1,630bn, an increase of 1.3 per cent in real terms, estimates the Stockholm International Peace Research Institute[156]. This was the slowest rate of growth in 10 years. In 2010, the UK and Germany cut spending by 1 percent in 2010, while France slashed its budget by 8 percent. With little prospect of a quick solution to Europe's debt problems, the likelihood of further cuts or spending freezes seems likely. Aside from possible job cuts and their knock-on effects in the defence sector, it remains unclear as to the effect this will have on business.

> Public debt by 2020 is expected to hit 124% in the UK, 114% in France, 9% in Germany and 55% in India

eServicing

As a result of the need to provide good service with a limited budget, governments increasingly intend to use online and self service capabilities to service and meet the needs of their citizens. Following customer consultation, Oxfordshire County Council, for example, realised there was a demand for improved access to its registration information and services. The council decided to develop its website and e-services strategy to make it more efficient and to improve accessibility, with the goal of having the best registration service website in the country through six innovative projects. These include an e-booking system; online certificate application and payment system; online ceremony fee payment system; e-brochures and MP3s; interactive tours of ceremony rooms; and signposting to partner information. Take-up of the online ceremony fee payment system is now over 80 percent. The council has also hosted numerous events for other registration services to give advice and share the secrets of their success[157].

eCare services

> The City of Essen's participatory budgeting effort to generate savings of 381 million Euros

In another example, the Welsh Assembly Government has announced additional investment in telemedicine and telecare services. The government has committed £7.3m to be spent on 'invest-to-save' initiatives including telecare and online booking for ambulances. Another £350,000 will be spent on telemedicine equipment to enable hospital clinicians to make a diagnosis of a stroke remotely. The assembly government believes the investment will cut costs by £14m a year and save £64m over the long term[158].

$1.63 billion

Total worldwide military spend
in 2010 – an increase of 1.3%

60%
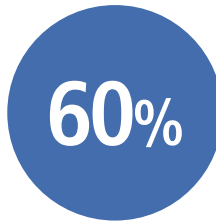
German cities that let their constituents
contribute ideas to governmental decisions

82%
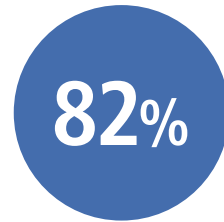
Access Europeans have to
basic public services online in 2011

eParticipation

The provision of eGovernment or eServices does not equate to
eParticipation however. The German Ministry of the Interior set out in
2008 to capture the state of eParticipation in German states and cities[159].
A rundown of results for each of the 50 cities shows that citizens overall
remain in the role of passive information receiver in urban planning
processes. 58 percent of the cities offer citizen the possibility to comment
on drafts and concepts but only 6 percent have virtual polls on urban
planning projects. Nevertheless, other areas fared better – some 60 percent
of German cities were found to try and include their constituents in the
early phase of budgetary planning by offering them the chance to submit
ideas – mostly through online forms and in 20 percent of the cases through
a participatory budgeting platform. The City of Essen's participatory
budgeting effort to generate savings of 381 million Euros, gained a lot
of attention, with a total of 3,776 registered users participating; leaving
over 2,700 suggestions and 113,000 comments/evaluations. The city
is still analysing the data. Besides the use of a forum and polls, citizens
could follow the discussion via Twitter which offered additional feedback
opportunity. Notably in the spring of 2010, Germany launched a drive for
a national eGovernment strategy to commence in 2015[160].

As of February 2011 Europeans, on average, could access 82 percent of
basic public services, such as job searches and benefit guides, online from
just 69 percent the year before, according to Europe's 9th e-Government
Benchmark report[161]. On eProcurement, Scotland was the only country
that actually has monitored the benefits it has achieved from adopting
eProcurement services. In the 2006-2010 period, the Scottish Government
has reported almost £800 million in audited savings from eProcurement.

½
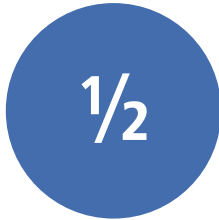
Amount of people currently
aged 55 and 64 planning to retire early

71.3
years

The age females in the UK will need to be to
achieve the same pension as 5 years ago

14%
GDP

EU public expenditure on healthcare in 2030 –
it's currently 8%

Volunteering

Not only is the modus operandi of government changing, but so too is its role. Enforced fiscal retrenchment is forcing government to turn to the voluntary sector in some instances. Whether financially or ideologically motivated, the Big Society fits with what Visions of Britain was calling for in 2010, namely '...a move towards local government and local volunteering (that) offers a chance for communities to benefit from the skills and energies of (mostly) older people[162].'

> By 2015, almost £10 billion of public money will be spent every year supporting the retirement of millions of public sector employees – up from £4 billion in 2010

The 'golden age' of pension income wealth is fading although half the people currently aged between 55 and 64 are planning to retire early. As a result, local activism, volunteering and representation is likely to biased towards more senior members of the community, particularly when you consider that the 60+ population will rise from 13.81m in 2009 to 19.53m in 2020 (Population Projections/National Statistics, 2009). Andrew Harrop of Age UK also believes that the voluntary sector should be a part of a longer process of retirement. He also thinks that there is a substantial constituency of older people who want to contribute to the community. 'A lot of people want to get into volunteering or want to get involved with community groups, adult education, things like that. In response, employers need to package work up to create flexible retirement options.'

The issue of voluntarism is, as identified above, dependent in no small way on the state of pensions. The Office for Budget Responsibility (June 2010) has disclosed[163] that by 2015, almost £10 billion of public money will be spent every year supporting the retirement of millions of public sector employees – up from £4 billion in 2010. The pension burden will almost certainly lead to higher taxes or greater cuts to public sector spending. In 2010-11, the amount spent by the taxpayer on public sector pensions will be £4 billion, rising to £5.5 billion the following year, the report said. The cost will then rise, on average, by 20 percent each year until the commitment reaches £9.4 billion in 2014-15.

Pensions

The impact of pensions on government goes beyond those in the public sector however. 2011 research from AXA shows that UK savers could face a shortfall in their pension funds unless they are able to work into their 70s[164]. Pension affordability has fallen by almost 40 percent since the end of 2005 and the average male saver who chooses to go ahead and retire today would face a pension of just over half what he could have obtained five years ago. The female pension affordability age now stands at 71.3 years, meaning women who wish to a retire on a similar pension income to what could have been achieved five years ago face staying in work for an additional six years and four months. AXA points out that whilst figures show that people will only be able to retire when they reach an average age of 71.2 years, the average age people think they will be able to retire at is 64.

IMPLICATIONS

→ Internet based and cloud services will be increasingly used by governments to service their citizens' needs.

→ Partnership with government will be key in order to shape the workforce of the future and to address society's needs and be provided at lower cost than has been traditional.

→ Volunteering will increasingly be integrated into governments service provisioning, particularly in their old age care services.

→ Healthcare will need to use information more effectively to ensure that the most effective remedies and interventions are used.

Recent legislation scrapping compulsory retirement may ease the situation somewhat, but business needs to prepare for a much older workplace than before. Government meanwhile may find itself being asked to fund the shortfall – might the retirement age need to rise faster than currently projected?

Healthcare

Public expenditure on healthcare in the EU could jump from 8% of GDP in 2000 to 14% in 2030

European healthcare is barely managing to cover its costs, according to the Economist Intelligence Unit's 2011 report on European Healthcare. The means of raising the necessary funds is inadequate to cover its costs and those costs themselves are soaring. According to World Bank figures, public expenditure on healthcare in the EU could jump from 8 percent of GDP in 2000 to 14 percent in 2030 and continue to grow beyond that date. The overriding concern of Europe's healthcare sector is to find ways to balance budgets and restrain spending. Unless that is done, the funds to pay for healthcare will soon fall short of demand.

Two interconnected trends: the ageing of the population and the parallel rise in chronic disease are fuelling this meltdown scenario. Those financial burdens are being exacerbated by the rising cost base of medical technologies. On the positive side, the prospects for eliminating many diseases are improving rapidly with the mapping of the genetic make-up of people who develop cancer, diabetes and heart disease. This is good news but is accelerating our life expectancy and increasing the burden of care for elderly citizens on our smaller workforce and on government services[165].

Insurance companies and other healthcare service providers hold data on the efficacy of the treatments they fund and deploy. Governments and healthcare service providers will need to become more adept at utilising this information to maximise the effectiveness of the available remedies.

The Futures Report 2011
prepared by Global Futures and Foresight
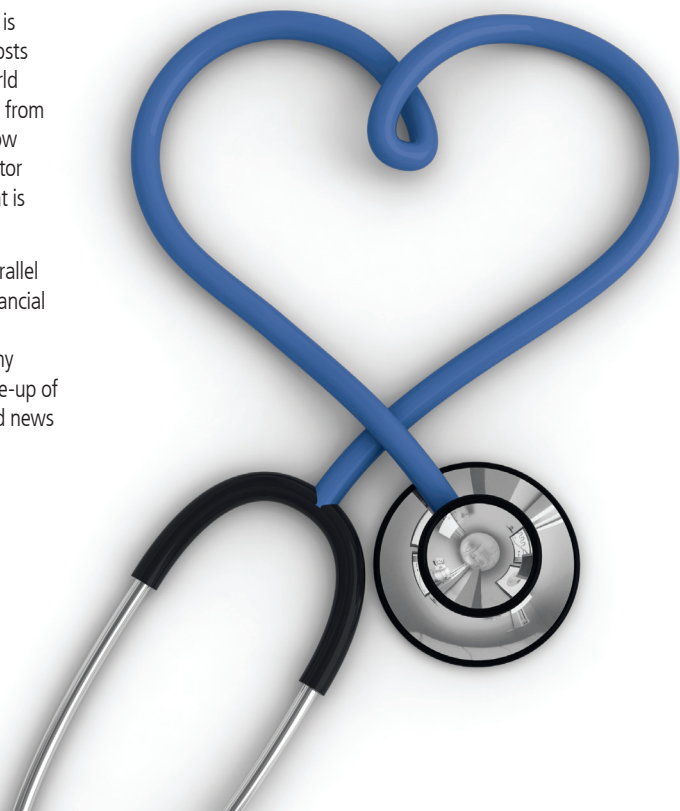
About the author

David is the chief executive of Global Futures and Foresight (GFF). In his 30 year business career he has held senior management positions in both large and small organisations and has gained real insight over that time on how visions of the future, if properly engaged, can help organisations achieve significant change and growth. He has been involved in public sector, commercial and financial markets and has held sales, marketing and general management positions in companies such as the UK based DRG group and Unisys corporation, the global US IT services business. Whilst at Unisys he held the position of Strategic Marketing Director for their $2bn global financial services business.

He co-founded The Global Future Forum in 2000, the Unisys global think-tank and since then established Global Futures and Foresight as a futures research business, helping business and government better prepare for the future. He has worked with many leading organisations around the world including; NATO, Microsoft, INTEL, Siemens, Unisys, Cisco, CSC, Royal Mail, HSBC, RBS, LloydsTSB, Lloyd's, RSA, More Th>n, DHL, ACORD, Reed Exhibitions, Mace, Mars, SPAR, Kraft, Heinz and many other household names across a diverse set of industries. He regularly works with academic institutions such as the Henley Business School and Tampere University in Finland and industry associations such as the Chartered Institutes for IT(BCS), Marketing (CiM), Purchasing (CiPS) and Directors (IoD).

As a regular international conference speaker and writer he has become recognised as one of the most influential future thinkers in our nation. He is a passionate believer that we are not victims of what the future might hold if we prepare ourselves in advance.

He has appeared on many tv and radio programmes including the UK ITN News, UK BBC, Middle East and Malaysian TV and on UK, Australian, German and South African radio. His experience has shown him the powerful impact that glimpses of the future can have on business and government alike if they embrace the drivers of change and are prepared to adapt.

Website: www.thegff.com

Twitter: davidsmithgff

Glossary of terms

A8 accession countries	The 8 countries that joined the EU in 2004.
Android	Open source software stack (Operating system, middleware and apps) that runs on mobile handsets.
Apple	Computer and more recently mobile technology manufacturer.
B2C	Business to Customer - online interaction.
BPO	Business Process Outsourcing.
BRIC	Brazil, Russia, India and China fast growth economies.
Cisco	Computer networks company.
Cloud	Applications, data and processing that is provided by service companies over the internet.
CO_2	Carbon Dioxide.
Crowdsourcing	Outsourcing tasks to a large, undefined group of people.
CSR	Corporate Social Responsibility.
Dementia	Loss of cognitive ability.
E7	Top seven emerging economies.
EBPO	Engineering Business Process Outsourcing.
ecare services	Care services provided over the internet.
Emerging markets	Relatively recent high growth economies.
eParticipation	Engagement with government and its services over the internet.
ER&D	Engineering Research and Development.

Eservicing	Providing services over the internet.
EU	European Union (27 member states as at 2011).
European Commission	The executive body of the EU.
Eurozone	The 17 EU member states that share the euro as a common currency.
FDI	Foreign Direct Investment.
FMCG	Fast Moving Consumer Goods.
Fortune Global 500	The world's top 500 corporations ranked by revenue.
G7	Global seven economies. The 'developed' economies.
gigabyte	One thousand megabytes.
Global Service 100 list	100 global outsourcing firms.
GM crops	Genetically Modified crops. The DNA has been altered.
Google	US based, global internet search, cloud computing and advertising technology firm.
Halal	Permissible under Islamic law.
IEA	International Energy Agency.
iPad	Tablet computer from Apple.
IPCC	Intergovernmental Panel on Climate Change.
iphone	Moble smartphone from Apple.
IT-BPO	Information Technology - Business Process Outsourcing.
Klout	Social Media Analytics firm. Measure social value.

Glossary of terms

mashup	Bringing together of two digital components to form a new product or service offering.
megabyte	A million bytes of data. A byte is a character such as an 'A'.
Micro-SD card	Small memory card used in mobile devices and digital cameras.
Microsoft	US based computer software company with a wide range of products.
Millennials	Age cohort born somewhere between mid 1970's to the turn of the millennium in 2000.
NGO's	Non Governmental Organisation.
OECD	Organisation for Economic Co-operation and Development.
ONS	Office for National Statistics.
Peerindex	Social Media Analytics firm. Measure social value.
Petabyte	One thousand terabytes.
PPP	Purchasing Power Parity.
R&D	Research and Development.
Reverse innovation	Innovations designed for emerging markets that are re-imported to developed economies.
RICS	Royal Institute of Chartered Surveyors.
Sebi (India)	The Securities and Exchange Board of India.
Smartphones	Mobile phones that have computer like capabilities.
Standard and Poors 500	500 large US companies that are traded on either of the two US stock markets.
terabyte	One thousand gigabytes.
Twitter	The short-form online blogging service. Each message is limited to 140 characters.
UKCES	UK Commission for Employment and Skills.
UN	United Nations.
UNCTAD	United Nations Conference on Trade and Development.
WEO	World Energy Outlook.
World Economic Forum	Forum held at Davos where world business leaders meet to discuss major issues each year.
WWF	World Wildlife Fund.
Zettabyte	One billion terabytes.

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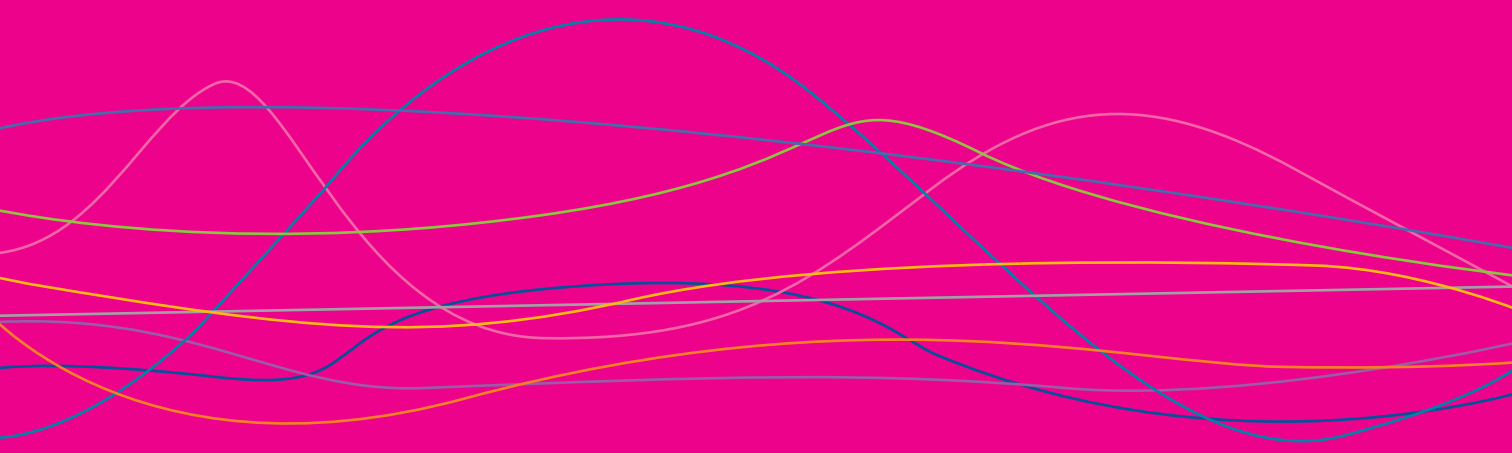| 100 | Source: http://www.psfk.com/2011/02/portable-cell-phone-charger-just-add-water.html |
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