

A large, bold, white 'A2' logo is centered within a magenta square. The background of the entire page is a complex, abstract network of thin, multi-colored lines (black, blue, green, orange, red) that converge and diverge, creating a sense of depth and connectivity. A thick, grey diagonal band cuts across the lower right portion of the image.

A2

NEW DIMENSIONS FROM ARUP | NO.10

Getting more with less

Is data the solution?

Inside this issue: how information can help you unlock efficiencies

ARUP

Getting more with less: is data the solution?



Welcome to the latest edition of A², Arup's business magazine. As living within our collective economic and environmental means becomes increasingly important, A² turns its attention to a major concern for us all: how we can get more with less.

We hear from IBM chief executive Stephen Leonard about realising the potential of data. Nobel Laureate Sir Paul Nurse gives us an insight into the collaborative future of medical research. And industry leaders offer their views on the challenges and priorities for our infrastructure networks – the life support systems of our society.

What emerges from our contributors' insights is the importance of data. Using data in new and clever ways can help us tackle issues ranging from creating efficient logistics operations to making the most of our ageing population. But we also hear about the essential role that leadership, vision, collaboration and long-term strategy play in achieving optimum solutions.

I hope that this edition of A² can be the start of a conversation about our shared future. And I hope you enjoy reading it as much as we enjoyed the interviews and discussions that produced it.

Alan Belfield
Director

For more information on any of the topics featured in this magazine, please visit www.arup.com or email a2@arup.com

03 **News**
The latest stories from the built environment and beyond

06 **Doing more with data**
IBM's Stephen Leonard on the power of smart technology and data

08 **An interdisciplinary future for medical research**
Nobel Laureate Sir Paul Nurse on why researchers need to collaborate

10 **The generation game**
How technology can help our ageing society benefit from its older people

12 **All change**
Industry leaders on how their sectors are changing forever

16 **All together now**
Are consolidation centres the future for urban logistics?

18 **Heathrow Airport: seamless surface access**
BAA's Allan Gregory on the benefits of improving surface access for Heathrow

20 **Collaboration is key for more with less**
How public sector clients can get more value for their money

22 **The road ahead**
What next for infrastructure? IUK chairman Paul Skinner looks ahead

24 **Going local**
Leaders from across the UK discuss the infrastructure priorities for their regions



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A template for a sustainable city

Copenhagen, one of the most sustainable cities in the world, has chosen Arup to help export its sustainability solutions to other cities around the world.

Working with the City authority, Arup developed a report on a range of sustainability models, 'Copenhagen: solutions for sustainable cities'. The report will help other cities replicate Copenhagen's success in reducing carbon emissions and addressing climate change. It covers:

- cleaning up city ports and providing recreational swimming in harbour baths
- coping with escalating demand for water
- creating sustainable, integrated transport networks
- making the most of waste
- using wind for renewable energy
- heating and cooling a city efficiently

The report covers the challenges, solutions and economic and environmental benefits that Copenhagen faced in each of these areas. 'Copenhagen: solutions for sustainable cities' provides a template for every city to become more sustainable.

1



1 'Copenhagen: solutions for sustainable cities' report
2 View of Addis Ababa

Addis Ababa gets sustainability framework



On 30 and 31 March 2011, the C40 Cities Group and Arup, together with the mayor's office of the City Government of Addis Ababa, hosted a workshop in the Ethiopian capital to develop a sustainable development framework for the city looking forward to the year 2023.

Around 200 representatives from government, funding agencies and NGOs attended the event. Sessions focused on improving the resilience of the city to climate change, looking in particular at river corridors and promoting water and

waste management in an area of the city identified for urban renewal.

Mark Watts, director of energy and climate change at Arup, said: "This was an exciting opportunity to work with a city to assess the current situation, plan for the future, and develop projects that can be carried out in the near term."

The Addis Ababa workshop was the fifth in a series helping C40 cities tackle climate change issues. Mayor Bloomberg, the current C40 chairman, released the latest C40 report in San Paulo on 1 June 2011 at the C40's biennial summit.



10 years of the Serpentine pavilion

Arup is celebrating 10 years of advising on the Serpentine Pavilion – an ambitious temporary architectural exhibition.

A specially commissioned pavilion is built each year in the grounds of the Serpentine Gallery in Kensington Gardens, London. Each pavilion is sited on the gallery's lawn for three months and must be completed within six months of being commissioned.

World-renowned Swiss architect Peter Zumthor is designing the 2011 pavilion, with structural engineering advice from Arup. Placing a garden at its heart, Zumthor's design emphasises the role the senses and emotions play in the experience of architecture.

The 2011 Serpentine Gallery Pavilion will be open from 1 July to 16 October.

New tool estimates cost and embodied carbon

Launched in April, the CO₂ST appraisal tool estimates both capital cost and embodied carbon of infrastructure construction projects.

Developed by Arup quantity surveyor, Bob Baker, and sustainability consultants, Helen Jackson and Lynsay Hughes, the tool helps design teams make quick decisions during the crucial early stages of a project.

"The ideal time to act on carbon is early in the planning and design phases," says Hughes. "Decisions taken then have effects throughout the lifecycle but detailed data isn't available at this stage. We developed CO₂ST so people could assess design options at the planning stage using industry-wide accepted cost and carbon values."

To see a demonstration of CO₂ST, email a2@arup.com.

3 2011 Serpentine Gallery Pavilion
4 Turner Contemporary gallery

Hepworth and Turner galleries open



Arup's lighting design and engineering teams have helped to create two dramatic new galleries- both designed by David Chipperfield Architects.

Opened in April, the Turner Contemporary gallery in Margate, Kent, provides a new seafront space for showing the works of JMW Turner and other internationally renowned artists. Arup provided consultancy and design services for daylighting, marine engineering, facades, security and sustainability.

The firm also worked on The Hepworth Wakefield. Opened in May in the city where

sculptor Barbara Hepworth was born, the striking building is one of the UK's largest purpose-built galleries outside London. Our specialists provided natural and architectural lighting design advice to ensure that the gallery's 44 Barbara Hepworth sculptures and other exhibits are beautifully lit.

For both galleries, Arup designed security measures to meet the Museums and Galleries Commission's requirements. This allows the galleries to display art under the Government Indemnity Loan Scheme and also to operate outreach facilities.



Designing for art on the move

Working in collaboration with Grimshaw architects, Arup has designed a mobile art pavilion to travel throughout Brazil during the 2014 FIFA World Cup and 2016 Olympic Games. The mobile structure aims to make international exhibitions, film festivals and arts education accessible to a wide audience.

To achieve this, Arup's team in Rio de Janeiro had to ensure that the pavilion could adapt environmentally, economically and socially to every location. A kit of parts and prefabricated wood trusses allow the Mobilizarte team to arrange the structure in different configurations, with the pavilion surrounded by gardens landscaped by the local community.

The 500 square metre pavilion will launch in the summer of 2012 and tour Brazil for four years in the run up to the 2016 Olympics.

Skanska and Arup partner on sustainable retrofitting

Skanska and Arup have announced a strategic partnership that could revolutionise the commercial property market.

The firms are providing clients with a jointly delivered green retrofit and refurbishment process that is set to transform a market worth in excess of £10bn per year in the UK. Through the partnership Arup and Skanska are integrating architectural, engineering, and financial risk analysis.

"This partnership bridges the gap between sustainability and value," says David Glover, Arup's global property market leader. "It allows portfolio holders to make forward looking changes that meet the requirements of new legislation, improve performance, reduce risks, and that satisfy the sustainability criteria of tenants, owners and investors."



SoundLab brings HS2 to life

As part of Arup's work on the High Speed 2 (HS2) rail line between London and the West Midlands, our unique SoundLab is enabling people to hear what trains would sound like at different points along the proposed route.

Between 13 May and 3 June, MPs and their constituents were invited to Arup's SoundLab in London to experience HS2 in 3D sound. These sound demonstrations are part of the Government's public consultation on the proposed route for the new line.

The sophisticated, purpose-built SoundLab also allows the project team to test the effect of different design options, such as noise reduction measures and the latest train technology.



Arup's sustainability experts have sharpened up SPEAR®, one of the essential tools for assessing how best to deliver more environmentally friendly projects.

The original SPEAR® – the Sustainable Project Appraisal Routine – was developed a decade ago to assess key factors including transport, biodiversity and culture. The tool has now been comprehensively revised to reflect how sustainability thinking has moved on since Arup first pioneered the approach, to incorporate issues such as climate change,

food and agriculture and sustainable behaviours.

"SPEAR® has really proved its worth on projects such as the Złote Tarasy, a mixed-use development in Warsaw," says Jonathan Ben-Ami, director of sustainability consulting at Arup. "The new model retains the advantages of a robust, auditable process and a clear graphical output, while offering users more options to customise the tool."

The updated SPEAR® framework features a new range of language outputs, including Chinese, and operates in accordance with key international sustainability standards such as the Global Reporting Initiative.

To learn more about SPEAR®, visit: www.arup.com/spear.

5 Artist impression of mobile gallery

6 SoundLab noise testing equipment

7 SPEAR® Diagram



Tiny transistors deliver big benefits

Smaller and cheaper transistors are making it easier to collect data on everything from weather systems to transportation networks.

Globally, we now produce more transistors every year than grains of rice. And transistors are so small that scientists in the US have attached them to honeybees to track their movements.

Creating a Smarter Planet

How do you infuse intelligence into a system for which no one enterprise or agency is responsible? How do you bring all the necessary constituents together? How do you make the case for investments? Where should you start? These are the questions IBM helps address through its Smarter Planet strategy.

In **Rio de Janeiro**, Brazil, creating a unified command centre for core city systems – water, energy, buildings, and other services – enables authorities to respond more effectively. On the day the system went live, a highway accident that would normally have taken 45 minutes to clear was dealt with in ten, keeping the city moving.

In **Galway Bay** on the west coast of Ireland, sensors on the seabed monitor marine life – including fish stock levels. This helps fishermen to fish more sustainably and economically for generations to come.

In **Peterborough**, UK, the Sustainable City Visualisation project has built a new platform to analyse, understand and collaborate using data on the city's energy, water, transport and waste systems. Residents and decision-makers in the city's local authority, local utilities and the businesses can make faster, more informed decisions about their resource use at community and city scales.

Doing more with data

Using smart technology to gather and analyse data in new ways can help you achieve your social, environmental and economic goals, says IBM's Stephen Leonard

“Data allows you to answer questions you never thought you could ask,” says Stephen Leonard, the chief executive for IBM in the UK and Ireland. “There’s more data available than ever before – covering everything from natural systems like rivers to financial systems and transport.”

Crucially, the technology needed to do this is already available. “The evolution of information means almost every aspect of life can now be interconnected and made intelligent,” explains Leonard. “Smaller, cheaper transistors and the growth of the internet have made it much easier to collect digital information.”

Leonard believes it's this data that holds the key to achieving sustainability targets. “In the past, governments and businesses have looked at economic, environmental and social issues in isolation,” he says. “But now people know that creating economic sustainability also means thinking about the social and environmental impact of what they're doing – and for that you need data.”

However, many leaders feel they don't

currently have access to vital information. A survey conducted by IBM in 2010 showed that 50% of chief executives felt they didn't have the information they needed to run their businesses better and meet the challenges of the next few years. Of those who did have the information they needed, 75% felt they would need more data by 2015.

Leonard highlights supply chains as an example of where gathering more information would enable better economic and environmental decisions. “Despite businesses making their own operations more efficient, 30% of what goes into a supply chain is still wasted,” he says. “Data allows you to examine these inefficiencies, for example by providing information to the lorries on loading bay availability, so they do not have to drive around till a loading bay becomes free.”

Of course, it's what you do with the data that counts – as the examples on the previous page show. “The key isn't the amount of data you have, but how you extract something useful from it,” says Leonard. “For this reason, the infusion of technology and the capacity to manage the huge amount of data this generates should be at the centre of an economic

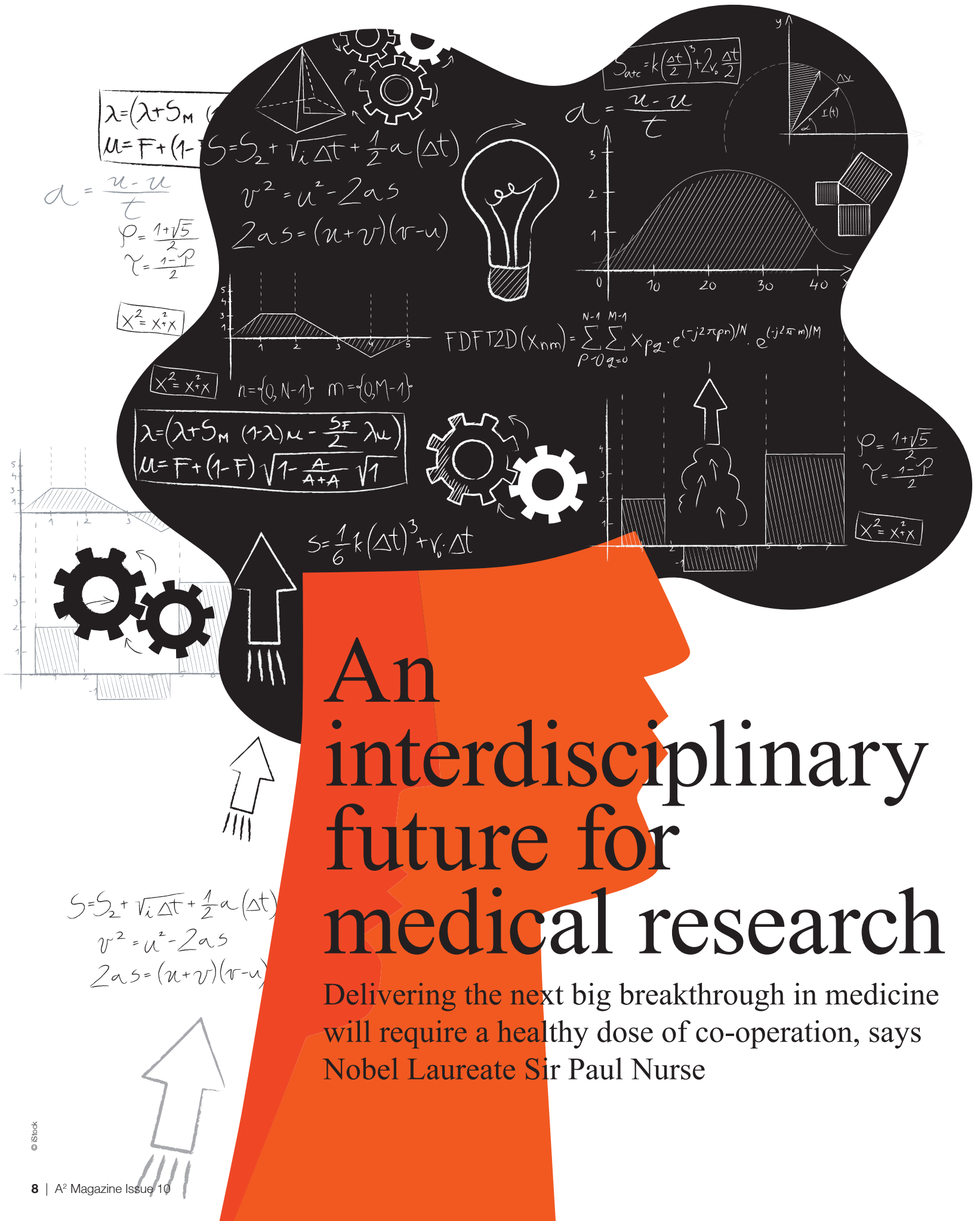
growth policy.

“Countries like Taiwan and South Korea that are coming out of recession strongly all put technology at the forefront of their plan to generate long-term economic sustainability. Rapid adoption of technology can make a big difference but it's important for political leaders to have vision, to imagine the difference information can make.”

Businesses leaders must do the same, says Leonard. “Chief executives need to have a vision and set preliminary targets for what they want to achieve with data, identifying the pathfinder projects for their organisation.”

“Technology will change the shape of business – it's down to companies and countries to decide whether they want to lead or be led,” Leonard concludes.

Stephen Leonard was talking to Arup director Volker Buscher, who leads the firm's Smart Cities initiative. Smart Cities demonstrates how the creative use of technology can transform 21st century cities and help them meet the challenges they face. To learn more, visit Arup.com and enter “Smart Cities” into the search box.



An interdisciplinary future for medical research

Delivering the next big breakthrough in medicine will require a healthy dose of co-operation, says Nobel Laureate Sir Paul Nurse

“Collaboration is vital for effective medical research,” argues Nurse, who is the president of the Royal Society. “In the past, biology and biomedical research have been drawn into silos, and people have become too focused on their own specialisms. We need to break down these barriers and take a more joined-up approach.”

Nurse believes that sharing data is key. “At the moment we are not making the most of the information and resources we have,” he continues. “Our balkanisation of data is inefficient. We need to balance drilling down into specialisms with keeping a broad base, looking more widely at the information available to us.”

“Organisations need to share their research, joining together to bring a more effective understanding of biology and biomedicine. For example, it may be that research by an organisation like the British Heart Foundation is also useful in the field of cancer.”

Getting the most out of such data will demand skills beyond those traditionally found in medical research, says Nurse. “We need to engage with other disciplines, such as physics, chemistry, maths and computing,” he argues. “Drawing on the knowledge of people in these fields will provide a broader foundation for more innovative medical research.”

Nurse is putting these words into action as he leads a new interdisciplinary medical research institute, the UK Centre for Medical Research and Innovation (UKCMRI). Project managed and designed by Arup and currently being built in central London, the centre is a collaboration between four of the country’s largest scientific and academic institutions — the Medical Research Council, Wellcome Trust, Cancer Research UK and University College London.

Nurse believes this sort of collaboration should extend to the private sector. “The pharmaceutical industry needs to start sharing its data too,” he says. “At the moment, they typically set up big trials with a very narrow focus. But if they shared the findings in the public



Sir Paul Nurse President of the Royal Society

arena, the data could be used for a much broader purpose – a collaboration which would make for a more efficient use of resources.”

“You only have to look at Viagra to see how research can have unexpected uses,” Nurse points out. “Viagra was originally developed as a circulation and heart disease drug, but the side effects were so obvious that it was used for erectile dysfunction. So while pharmaceutical companies might be focused on finding a drug for a specific problem, there are often wider benefits to be gained from their research.”

Nurse also argues that, for medical research, the NHS is an underused resource. “We have an amazing research resource in the NHS, but we are not exploiting it,” he says. “As a large, single-system organisation it is a ready-made research tool, and we should use it more effectively. Biomedical studies, such as those on predispositions to disease, could benefit hugely from using the information held within the NHS.”

The UKCMRI embodies the interdisciplinary approach Nurse advocates. “We want to provide a new model for biomedical research, collaborating globally with other disciplines to gain a deeper understanding of medical science,” he explains.

“By breaking down traditional disciplinary boundaries, we hope to generate new insights into the biological mechanisms that control cell, tissue and body function. Using this knowledge we can manipulate cellular processes to tackle the root causes of diseases such as cancer, heart disease and stroke – the UK’s biggest killers.”

“We have the opportunity to redefine how research institutes are organised and run,” he continues. “We want to show that by breaking away from the traditional, specialised way of working and drawing on mathematicians, computer scientists and engineers, we can push the boundaries of biomedical research.”

Nurse hopes this approach will also have wider benefits. “By training medical researchers how to mine and make sense of all kinds of data, we make it easier for them to change between disciplines or swap careers,” he says. “They can move seamlessly into business or industry — and we can embed science across society.”

For information on Arup’s work on collaborative research, information systems, and change management, please contact Stephen.Pollard@arup.com, our healthcare business leader.

The generation game

How technology can help our ageing society benefit from its greatest untapped resource – older people

“There is a huge opportunity to benefit from an ageing population, if we can see it as an opportunity rather than a crisis,” says Baroness Sally Greengross, chief executive of the International Longevity Centre (ILC).

With the number of centenarians in the UK predicted to hit 64,000 by 2033, this ‘generation A’ is a growing population. Although many will require care in their old age, many will stay healthier for longer than their parents and grandparents — making them ideally placed to contribute to society and the economy.

So how can we make the most of ‘generation A’? Greengross believes technology is key. “Technology can help care for people, create a community and keep families in touch. But helping older people to embrace technology could really benefit wider society too — for example by cutting acute care costs and creating a new market for technology.”

It’s a view that Volker Buscher, a leader in Arup’s work in information technology and communications systems, shares. “Technology could definitely help to reduce care costs in the future. For example, for people with Alzheimer’s Disease, smart phones could help people find out where they are, or send a message to say ‘I am here. I need some help.’”

“But for this to work, people in ‘generation A’ need to adopt it now,” he continues. “It’s hard to train people to use technology when they’re in the middle of a crisis. Adopting it earlier, and using it in their day-to-day life, means it will already be familiar when they need it for this kind of application.”

At the moment, relatively few older people are making use of technology such as the internet. In fact, a recent report from Independent Age, a charity supporting older people, points out that 70% of over 65s have never used the internet.

For Greengross, the problem is that while technology such as smart phones is readily available, technology producers don’t typically design their products or services for, or market them to, older people. “We need to design technology so that it’s easy for older people to use and understand,” she says. “If we do this we can transform people’s lives.”

Buscher agrees. “Currently, in the vision of a smart future, the older generation just doesn’t feature,” he says. “The problem is awareness – marketers are ignorant of these people in the marketplace. So businesses are missing out on potential profit and the government is missing the opportunity to get people familiar with smart technology.”

Analysis by the Personal Finance Research Centre at Bristol University highlights the untapped consumer wealth this demographic represents. It found the older consumer market is set to grow by 81% between 2005 and 2030, while the 18-59 year olds market is only forecast to increase by 7%. This will mean that, by 2030, over 65s will account for 25% of the UK consumer population.

To help society benefit from this older population, Buscher believes IT needs to be seen as the connector between generations. “The young need to act as mentors for older people, showing them how to use technology, and helping them understand it. The older generation can reciprocate by sharing their knowledge and experience. Used in this way, technology could create a more inclusive society.”



Baroness Sally Greengross
Chief executive of the International Longevity Centre (ILC)

A study by volunteer charity WRVS estimates that in 2010 people over 65 contributed £40bn to the UK economy through their taxes, spending power, care provision and voluntary work. (WRVS, ‘Gold age pensioners’)

As people remain healthier for longer, WRVS estimates that by 2030, the positive net contribution of over 65s in the UK will rise to an estimated £77bn. (WRVS, ‘Gold age pensioners’)

Although a smaller percentage of older people are online, older people are the fastest growing group of internet users. (Internet Access, Households and Individuals 2009, Office of National Statistics)

People aged over 65 who have internet access spend more hours online than the average for all ages. (Delivering digital inclusion: An action plan for consultation, Communities and Local Government, 2008)

In 1917 there were 24 people over 100 years old. By 2009, there were over 9,000. And by 2033 there may be 64,000 centenarians.

International Longevity Centre, 'The future of age'



All change

Leaders from **healthcare, education, engineering, technology and finance** discuss how the sectors are changing forever.

Healthcare

The healthcare sector needs to find innovative solutions if it is going to overcome the challenges it faces, says **Professor Lord Ara Darzi**, author of the NHS Next Stage Review

Drivers

“There are currently three main challenges for the healthcare sector in the UK: increasing costs, increasing demand and the recent economic downturn,” explains Darzi.

He points out that with average life expectancy now ten years higher than it was 60 years ago the NHS is feeling the strain of increasing demand.

“Demographic changes are placing the NHS under huge pressure,” says Darzi. “Many acute, lethal illnesses of the past – such as cancer, diabetes and cardio-vascular disease

– are now chronic long-term conditions. And with an ageing population, the burden of providing long-term chronic disease care is immense.”

The biggest pressure on delivering this care is cost. “We have 17 million chronic disease patients in the UK, which is a big financial burden,” says Darzi. “Lifestyle diseases, such as obesity, are also leading to a rise in healthcare costs. We need to find more cost-effective care delivery models – particularly for chronic disease management.”

Reducing costs means finding innovative care solutions, says Darzi. “Innovation in other sectors has improved quality and access, and reduced costs. There are opportunities to do the same for healthcare.”

“Over the next five years we need to find new delivery models,” he continues. “For example, chronic disease management is not something that should be delivered in

hospitals. It is expensive, impractical, and it is not patient-centred. Instead, we need to move care closer to the patient using primary care or home care.”

Barriers

The challenge for the NHS is that moving to more patient-centred care requires a big change. Darzi argues the success of that change depends on involving staff in transforming the service.

“There are two types of change we can make

with them, and not to them, the reforms will not succeed.”

Although reducing costs is driving change at the moment, Darzi sees technological innovations in drugs, and the introduction of personalised healthcare as future drivers. “Personalised medicine is going to transform healthcare, because we will be treating the individual patient, rather than the disease,” he predicts.

“This will bring a huge change to the sector,” he continues. “It also shows how change can be positive. After

“We need to move care closer to the patient using primary care or home care”

– organisational or transformational,” he explains. “For me, transformational change is the best way forward. In any healthcare system, not just the NHS, it is the frontline staff who deliver healthcare change. Unless they believe change is being done

all, quality in healthcare is a moving target and we must constantly evolve to meet it.”

Read more about the UK’s changing demographic on page 10 as we explore how society can benefit from an ageing population.

Across sectors, our interviewees highlight heightened, sustained levels of change and uncertainty.

Healthcare, education, engineering, technology and finance are grappling with drivers shaping a new operating environment and bringing new challenges and opportunities.

Professor Lord Darzi explains how the economic climate has focussed the healthcare sector on cost savings and efficiency gains. The sector's future will rest on its ability to develop innovative solutions which improve access to care and quality of care, particularly for chronic diseases and lifestyle conditions such as obesity.

While the healthcare sector in the UK is experiencing some deregulation, higher education is facing a wave of government regulation. New metrics to measure performance will be enforced at a time when budgets are severely constrained.

Dr John Green explains how Higher Education Institutions (HEIs) are being challenged to rethink how they deliver services. For research institutions, like those in the Russell Group of universities, there will be more competition for fewer

contracts. This may mean some will have to invest in their strengths and cut back in other areas. Those HEIs that focus solely on teaching will increasingly see students as customers.

In engineering, the outlook is different — Network Rail's director of investment projects, Simon Kirby, points out that the government has promised greater investment in rail. But he also stresses that collaboration is needed to deliver value for money, particularly at the local level.

Indeed, local partnering is a central theme in Jorg Nowack's comments on the technology sector. Nowack highlights Hitachi's three key strategic goals as it seeks to cement its position as a global giant: sustainability, convergence or 'fusion' and globalisation.

The banking industry is in a state of flux too. Professor Andrea Buraschi explains how financial authorities have attempted to mitigate systemic risk with the US Dodd-Frank Act. He discusses how the global economic downturn has heralded the end of the super-sized, universal bank. And he predicts the future will bring smaller, more specialised banks as financial institutions try to restore consumer confidence with a move towards greater transparency, value and simplicity.

These are clearly uncertain, interesting times.

Education

Changes to funding could have profound effects on UK universities, says **Dr John Green**, an honorary research associate at Imperial College London

Drivers

Since 1992 the higher education sector ('universities') has essentially been fragmented into two parts: the teaching-led institutions, and the research-intensive institutions," explains Green. "Each group now faces its own unique challenges."

"For the teaching universities, the biggest driver is attracting the brightest students. This brings associated challenges such as equality of access, funding and — very topically — fees. Fees are a particularly strong driver, and we are all waiting to see how

the marketplace will develop."

But could tuition fees be a missed opportunity to fill the UK's skills gaps? "We have a huge shortage of people reading subjects like physics and chemistry," says Green. "The new fees could have been used as a lever to encourage students into these courses, and fill the gap in the country's skills base."

"For research-intensive institutions the challenge is very different," Green continues. "They are facing a static government settlement for research and development funding, so they are competing for an ever-decreasing pot of money in real terms. This means there will be more focus on the best universities, and it will become increasingly challenging for universities who don't have a great strength and breadth of research. This will drive universities to examine critically their research portfolio more critically."

"Over the next five years I believe we will start to see a lot of consolidation in the sector," says Green. "The strong will become stronger, those in the middle will start merging and grouping together, and there may be some privatisation, with companies coming in to form partnerships with financially-challenged universities."

"The strongest universities are already looking at whether they should go private, and have started modelling what would happen if they cut themselves free from government support for infrastructure and thereby from government regulation. So in five years time I would not be surprised to see the UK moving closer to an Ivy League model as in America," he concludes.

Barriers

There are two factors limiting growth in the higher education sector, Green says. "The first is that we are moving towards being centrally regulated and

measured — much like the NHS. The government doesn't want everyone to charge the maximum fees, so they will regulate the number of students that can attend each university, and penalise universities for over recruiting."

"The second factor is that universities have always had difficulties restructuring themselves," he continues. "70% of a university's costs are in its

"The new fees could have been used as a lever to ... fill the gap in the country's skills base"

staff, but downsizing is a very difficult exercise — performance management is resisted in 95% of universities. But if they want to grow and succeed in the future, institutions need to overcome this and start tackling the difficult challenges of restructuring."

Engineering

The engineering sector must embrace collaboration if it wants to move forward, says **Simon Kirby**, director of investment projects at Network Rail

Drivers

“At the moment there is only one key driver for the engineering sector: delivering value for money,” says Kirby.

“For the rail industry, the 2010 comprehensive spending review promised investment,” he explains. “Now the challenge is delivering this investment with reduced costs and at better value for money. The only way to achieve this is through collaboration.”

But how do you foster a culture of collaboration? “At Network Rail we are devolving our centralised structure to create ten regional businesses,” says Kirby. “And we are creating a dedicated project team to ensure we work more closely with our key partners. Changing to a local business unit means we can better understand our customers’ needs.”

It’s not just Network Rail that should be focusing on

“Behaviour is certainly a big challenge”

collaboration, believes Kirby — the entire engineering sector needs to embrace this way of working. “If we want to meet the challenge of delivering value for money throughout

the industry, businesses need to collaborate,” he says.

“To drive this, we need to change behaviour. We need to empower people with the right behaviours so they can work openly, honestly and effectively with other organisations. If we do this, we can create a culture of collaboration throughout the supply chain, and across the industry as a whole.”

“At Network Rail, we’ve studied supplier engagement around the world, across a number of different industries – including rail, defence, and oil,” continues Kirby. “Although each sector is at a different stage of the process, it’s clear that with the right behaviours and internal structures, collaboration can be incredibly successful.”

“Delivering value for money is going to continue to be the focus for the industry over the next five years. The businesses that successfully rise to this challenge will be those that innovate and work collaboratively to reduce costs,” he concludes.

Barriers

Changing organisational behaviour is a significant barrier for the industry, says Kirby. “Behaviour is certainly a big challenge,” he acknowledges. “We need to change the way people work, breaking down corporate silos so they can form external partnerships. And we need to support this with an incentive mechanism that encourages the behaviour the sector needs.”

“But changing behaviour and fostering collaboration cannot be a step that is taken by one business. The whole industry needs to move together so we can deliver cost savings right across the supply chain. If we do this, we can create the

belief that the industry will meet the challenges it faces.”

Read more on delivering value for money through closer collaboration in our article on strategic infrastructure procurement on page 20.

Technology

Collaboration is the key to future development, says **Jörg Nowack**, Hitachi’s VP of Business Development for Europe

Drivers

“There are three key drivers shaping Hitachi’s business and the technology sector right now: sustainability, fusion and globalisation,” says Nowack. “And they will continue to

voltage grids,” he explains. “They are enabling the introduction of renewables based power generators onto the grid, and helping us meet increasing electricity demand.”

“By combining these engineering solutions with new developments in IT, in particular software, we can enable product and service innovation across many sectors, such as healthcare and transport,” he continues.

But for Nowack, it is globalisation that is driving the biggest change. “We are seeing intense global competition in the technology that simply did not exist three or five years ago,” he explains. “Now Hitachi is facing competition from countries such as China and India, not just for market opportunities, but also in mergers and acquisitions. And we are not alone.”

“We need to convince people to adopt new products and innovations”

shape our sector over the next five years. It’s all about providing technological solutions to help society become more sustainable, combining engineering and information technology (IT) solutions and taking advantage of the globalisation around us.” “These three drivers fit in with Hitachi’s key focus, which is on our Social Innovation Business,” Nowack adds.

With increasing awareness of sustainability, Nowack believes the technology sector has an important role to play in delivering new sustainable solutions. “Electrical engineering products, such as transformers or power electronics systems, are enhancing the functionality of our low, medium and high

“This global competition is changing the shape of the technology sector,” Nowack continues. “It is forcing companies to find new business models, and to collaborate with local service providers around the world. Collaborating in this way is essential if we are to take advantage of globalisation and drive future development.”

Nowack believes this future development will be centred around software. “Over the next five years we are going to start seeing more and more infrastructure run through intelligent, data analytics driven control systems, embedded software applications and mobile terminals,” he explains. “This paradigm shift, sometimes referred to as

the ‘Internet of Things’, will bring increased functionality, and it will open up lots of possibilities for remote monitoring and management,” he continues.

The result of this development? “Infrastructure and its operation will be less and less centralised,” Nowack predicts. “Energy is a good example of this – businesses and local communities will soon become mini power generators, resulting in a distributed energy system.”

Barriers

Although collaboration is needed to meet the challenge of increasing globalisation, it will almost certainly create some barriers as well, warns Nowack. “To enable collaboration with local service providers, we need to develop new skills within technology companies like ours. While this can be seen as an opportunity, it is also a significant obstacle in the short term.”

“As well as this, there is likely to be general organisational resistance to the new business models,” he continues. “Because to generate new revenue streams from new global markets, you have to replace old revenue streams.”

Along with the difficulties associated with collaboration, Nowack believes overcoming the adoption barrier is the other key challenge facing the technology sector. “We need to convince people to adopt new products and innovations,” he says. “But with concerns around privacy and data protection, there can be a great deal of user scepticism to new developments. To overcome this, we need to work on creating trustworthy solutions.”

“For Hitachi, if we can meet

these challenges we will move from being a large Japanese company, to being a global giant,” Nowack concludes.

Finance

The finance industry will have to change rapidly to respond to regulatory challenges and faltering consumer confidence, predicts Professor **Andrea Buraschi**, chair of finance at Imperial College Business School

Drivers

“The financial industry is at an important junction,” says Buraschi. “It has been through several phases of regulation and evolution over the last century, and faced many challenges. But right now, it faces two key drivers – regulatory and ethical change.”

“Legislation, such as the Dodd-Frank Act, is forcing regulatory bodies to think about systemic risk, and bringing changes to the rules on capital requirements. For the first time, regulators are thinking directly about the financial system as a connected network,” believes Buraschi.

“The outcome of the discussion on the ‘too big to fail’ issue will affect the size, focus and shape of banks,”

“Today you can trust Tesco more than Lehman Brothers”

he continues. “As a result, we will start to see the end of the universal bank, with increased competition from specialised financial institutions.”

This increased competition is where Buraschi sees the

biggest changes occurring. “In retail banking, we will see a shift in power from traditional banks and credit card companies, to less traditional competitors like mobile phone companies and supermarkets.”

“Many of these changes – like mobile phones acting as mobile banks and supermarkets selling financial products – are already happening,” he concludes. “They have been driven by the current lack of confidence in the banking sector – today you can trust Tesco more than Lehman Brothers.”

“In five years time, the business will be more focused on simple, traditional services where real value can be created – like better diversified asset management products, or universal mobile payment technologies. And lending will return to simple, more transparent products with no hidden fees, and less use of unnecessarily complicated financial engineering products.”

Barriers

Buraschi believes that one of the biggest challenges for the finance industry is how to reprivatise the financial intermediation process, and reopen the securitisation market that existed before the credit crunch – without the excesses of the last ten years.

“Since the global financial

crisis the lending model has changed,” he explains. “It is no longer the private sector that’s at the centre of financial lending, but central banks. The challenge now is how to reinstate the private sector

to the centre of the financial intermediation mechanism.”

“At the same time we need to rethink the intermediation process, so that we remove the incentives and moral hazards that lead to the excesses of the past,” he continues. “Securitisation should be restarted through government initiatives that focus on standardisation and transparency. That way we will restore confidence in the sector.”

Buraschi believes new accounting rules will help the industry to achieve these goals, but adapting to them will be challenging. “Over the last century the finance industry has behaved like a living organism, mutating and adapting to large-scale events such as the Great Depression, and to ethical changes like international competition. So, while the sector overall will certainly adapt to these new rules, some players will succumb.”

For more information on the drivers mentioned in these interviews, visit Arup’s foresight team at driversofchange.com or see the specific references listed here:

Skills (Education)

<http://aru.ps/wdc3aad>

Transport (Engineering)

<http://aru.ps/wdc32bc>

Chronic disease (Health)

<http://aru.ps/wdcba1b>

Obesity (Health)

<http://aru.ps/wdc12ce>

Demand management (Technology)

<http://aru.ps/wdce394>

Emissions (Technology)

<http://aru.ps/wdc4123>

Smart metering (Technology)

<http://aru.ps/wdcc894>



All together now

Are consolidation centres
the future for urban logistics?

Order stationery for an office in Regent Street, London, and you might well find it being delivered by electric bike. It's part of a scheme put in place by The Crown Estate, the street's freeholder and manager to improve the environment of the area.



Similarly, deliveries to shops are consolidated in a centre run by Clipper Logistics and then delivered to their destinations more efficiently. Since it opened in 2009 the Regent Street consolidation centre has reduced the number of delivery vehicles to participating retailers by an impressive 80%.

“Retailers are happy because they get their deliveries in a way that suits them,” explains Darren Briggs, leader of Arup’s logistics team, which is managing the project. “Some shops had been getting so many different deliveries that dealing with them took up too much staff time.”

“The consolidation centre enables retailers to hold stock remotely more cheaply than they could store it on Regent Street,” he continues. “And also hold more stock close to the retail unit for peak trading periods ensuring they do not run out.”

The scheme is also making for a happy landowner. “Creating better conditions for pedestrians by reducing the number of vehicles in the area is a key component of our £750m regeneration of Regent Street,” explains Peter Bourne, public realm manager for The Crown Estate. “The Regent Street consolidation centre is already helping to deliver a better environment and is providing a solution to our tenants for their deliveries during the 2012 Olympics.”

The Regent Street initiatives do not just serve retailers. “Research we carried out at the beginning of the project revealed that 28% of deliveries and collections were for the offices above the shops,” Briggs explains. “So we’re also targeting offices with initiatives like preferred supplier schemes to cut the number of deliveries they need.”

With offices concentrated along Regent Street, stationery from Office Depot can be easily delivered using electric vehicles from GnewtCargo. “Our fleet consists of electric vans and electric pedal-assisted cargocycles – where riders still pedal but are assisted by an electric motor,” explains Gnewt director Matt Linnecar. “These vehicles take up less space at the kerb than traditional vans, produce zero emissions and offer businesses deliveries when they need them.” Other office consumables such as sandwiches, milk, newspapers, water and courier services are to be added soon.

Londoners could soon be seeing more vehicles

like this on their streets if plans to use consolidation centres across the city are given the green light. In autumn 2010, the Mayor of London, Boris Johnson, revealed that he was considering the idea and Arup is working with Atos Origin, Clipper Logistics, TNT and Transport for London to investigate the feasibility of a city-wide scheme. Measures like this will become a necessity with the European Union threatening £300 million fines as a result of London’s poor air quality from June 2011.

Elsewhere in the UK, other consolidation centres have enjoyed similar success. Bristol’s Broadmead consolidation centre serves 56 retailers, reducing their vehicle movements by 77%. By using a consolidation centre at Heathrow Airport, BAA has been able to target a 75% reduction in the number of vehicles delivering to the airport. So why aren’t they used more widely?

“The big difficulty with city-wide schemes, such as our London proposals, is getting lots of smaller, less efficient businesses to sign up. This is expensive and not an attractive proposition for logistics companies,” explains Briggs. “They may be tied into three or five year contracts with suppliers, or they may simply not be aware of what consolidation centres can do for them. For Regent Street, The Crown Estate has funded the cost of marketing to promote the centre.”

“Because of the environmental targets imposed on many cities and the huge potential of consolidation centres to reduce traffic, I think more cities will push for them and, in doing so, fundamentally change the structure of supply chains,” concludes Briggs. “The issue will be who pays for them.”

Delivering efficiencies

Without consolidation centres, businesses may get multiple deliveries from lorries that are only partially loaded.

Instead, suppliers can deliver to consolidation centres located outside congested areas. The centres take these loads and transfer them on to fully loaded vehicles.

Vehicles then make fewer journeys into congested areas, but can still deliver when it suits businesses. And the suppliers reduce their fuel costs by making more efficient deliveries to the consolidation centres.



Heathrow Airport: seamless surface access

BAA's Allan Gregory talks to A² about why improving surface access to Heathrow Airport makes sense for travellers, for the economy and for the environment

“Quite simply, surface access is about how people and freight get to and from the airport,” explains Gregory, who is surface access director at BAA.

By improving surface access to Heathrow Airport, Gregory and his team aim to improve passenger experience, ease congestion and help reduce the airport’s carbon footprint. He describes these challenges as the three Cs – connectivity, congestion and carbon.

Their goal in addressing these challenges is making sure surface access is not just good, but excellent. “Excellent surface access needs to provide not only the expected basics – such as safety, security and predictability – but also seamless connections with a great passenger experience, fast journey time and frequent service” Gregory explains.

In today’s financial climate, they are also under pressure to ensure surface access is cost-effective. And that means making existing assets work harder. “By using existing infrastructure more effectively, we can deliver improvements in surface access, without significant additional costs,” says Gregory.

The key to doing more with existing infrastructure, Gregory believes, is integration. “Excellent surface access demands an integrated approach,” he says. “Road, rail and aviation need to join together to develop strategies and create projects that will benefit passengers. If

“Economic growth and connectivity go together”

we’re really going to get more for less, then transport has to be integrated.”

Gregory points to the Heathrow Express as an example of excellent, integrated surface access. A rail line designed around aviation passengers, the Heathrow Express provides a direct link from Paddington Station to the airport, covering 15 miles in just 15 minutes. Customers can view flight information screens and use self-service check-in machines for selected airlines at the station.

As a result of this focus on passenger experience, Heathrow Express is consistently rated highly by travellers. In the 2010 National Passenger Survey, the

service achieved an overall satisfaction rating of 93% – one of the highest for a train operating company in the UK.

Heathrow Express is an example BAA is keen to replicate as it works to achieve its target of 40% of air passengers travelling to and from Heathrow by public transport by end of 2012, with an objective of 45% in the longer term. “We want to capture the success of Heathrow Express in future projects – whether that’s Crossrail, high-speed rail lines or other transport links,” says Gregory. “It shows how the aviation and rail industries can work together to provide excellent connectivity and improve the passenger experience.”

“In the past, aviation and rail have been seen as competitors,” he continues. “In the future, we’re keen to enhance Heathrow’s position as an integrated multi-modal transport hub where people come not just to fly but to get on other forms of transport – such as high-speed rail links. It’s about air, road and rail working together for the common good of the UK.”

This integrated approach isn’t just focused on air passengers and freight. BAA is also keen to deliver excellent surface access for the 70,000 people who work at Heathrow Airport. Heathrow has the largest car-share scheme in the world and is busy developing plans for a new Cycle Hub. And a well-publicised Heathrow free travel zone is used to make over half a million free bus journeys in the local area every year.

Behind these achievements is what Gregory describes as BAA’s recipe for success – a focus on the importance of partnerships in surface access. “Surface access isn’t necessarily under our direct

control,” he points out. “So it’s really about stakeholder engagement, helping and working with the airlines, the airport, policy makers and the UK’s transport industry to provide excellent surface access. We need to work in partnership, have great ideas for sustainable travel choices and make sure they’re marketed correctly.”

Through this partnership approach, Gregory believes surface access can make an even bigger impact. “Economic growth and connectivity go together,” he says. “Our research shows that, after destinations available from an airport, the business community values surface access most highly. Like other passengers, they want a

direct, seamless connection to their airport. With excellent surface access we can support London as a leading global city.”

With Heathrow in competition with other major European airports, Gregory believes that, by providing the best connectivity, Heathrow can play a major role in attracting international business to the UK, which, in turn, will drive economic growth. “As the country’s only intercontinental hub airport, easy surface access can help make Heathrow the UK’s gateway to the world,” he concludes.

The three Cs: key challenges for surface access

1. Connectivity

BAA is focussed on integrated transport that will give people from all over the UK easy, reliable access to Heathrow Airport – emulating the success of the highly rated Heathrow Express. It has already produced downloadable applications for mobile devices that give people live travel information to help plan their journeys.

2. Congestion

With West London one of the most congested areas in Western Europe, BAA is working with local organisations to tackle congestion through the award-winning Heathrow Area Transport Forum. It has also negotiated a 75% discount for its staff to travel on the Heathrow Connect train service – part of a campaign for which its commuter team won the 2011 London Transport Award for Excellence in Travel Information and Marketing.

3. Carbon

For BAA, the key is making low-carbon choices attractive. High-speed rail offers the potential to encourage people from the north of the UK to travel by train to Heathrow instead of taking short-haul flights to European hub airports. At a local level, BAA’s successful car-sharing scheme has reduced single occupancy vehicles using incentives such as reserving the best parking spaces for car sharers.

- When the first permanent Heathrow terminal was opened in 1955 it carried 63,000 passengers a year. It now carries 67 million – around 125,000 every day.
- 70,000 employees work for BAA, the airlines and the airport and commute to Heathrow.
- Heathrow carries 1.3 million tons of cargo freight each year, and it is the UK’s largest port by value.
- 65% of Heathrow Airport passengers arrive on surface access transport – the remaining 35% are transfer passengers.

Collaboration is key for more with less

Experience in Wales and Northern Ireland shows how – with strong leadership – public sector clients can get more value for their money in infrastructure procurement



Aerial view of Church Village Bypass

When public finances are under strain, the temptation for governments and local authorities is to procure new infrastructure such as roads at the lowest possible price. But recent projects in Wales and Northern Ireland show the benefits of taking a collaborative, better value approach.

This approach has enabled the Church Village Bypass project in Rhondda Cynon Taf, Wales to meet the tough targets on waste and sustainability set by the Welsh Assembly Government (WAG). The project eased congestion, brought an estimated £27m into the local economy, won environmental awards and used recycled materials extensively.

So how did collaborative procurement help? “It’s about creating a culture of

collaboration,” explains Mike Edmonds, a procurement expert at Arup who worked on the Church Village project. “If you select someone on lowest price, where is their incentive to do anything other than push the price up?”

With an incentive in place for the client and contractor to work together, they were able to value engineer the project to save an estimated £35m and enjoyed over a million man-hours on site without a reportable accident. The team introduced the idea of using GPS to track plant equipment safely and efficiently. And using pre-cast bridges saved around 100,000 man-hours.

Darren James is managing director of Costain’s infrastructure business, the contractor for the Church Village Bypass. “The project and the wider objectives were made more successful by the way we worked in a totally integrated team



The project eased congestion,
brought an estimated

£27m

into the local economy

with Rhondda Cynon Taf officers and other stakeholders,” he explains. “Together we focussed on delivering best value for the local and wider communities.”

Better value and collaboration are not new concepts – the Latham and Egan reports of the 1990s recognised that lowest price tendering wasn’t delivering on quality, time or cost. The NEC contract was introduced to help organisations engage suppliers for civil engineering projects in a non-adversarial way.

Edmonds and his colleagues at Arup have taken a lead. They used the NEC contract for the first time on the Millennium Coastal Park. This Millennium Commission project transformed 1,500 acres of industrial wasteland in Llanelli, Wales, into 20km of coastal parkland with cycle trails and wildlife areas.

“Using experience from this project, we went on to devise an approach focussing

on quality and value for procuring the Toome and Limavady bypasses in Northern Ireland,” explains Edmonds. “This award winning approach has since been adopted for many more DRD Roads Service schemes.”

Having helped to pioneer a collaborative approach to procurement, Edmonds and his team are currently using it on the A8 dualling project in Northern Ireland and to upgrade routes along the M4 corridor in South Wales. He believes the key to the success these projects have enjoyed is strong leadership.

“It takes strong leadership to embrace a collaborative approach,” says Edmonds. “It doesn’t always make for an easy ride but it does mean improved relations and common objectives. And meeting the challenges ahead will need closer collaboration, and even stronger leadership.”

Benefits of the bypass

- This £90m Church Village Bypass eases congestion on the A473 between Tonteg, Church Village, Llantwit Fardre and Efail Isaf.
- The building work employed around 4,000 people – including 50 unemployed local people.
- More than 90% of sub-contracts were awarded to companies based in South Wales.
- Recycled materials were used for 70,000 square metres of the road surface.
- No infill was brought on to the site.
- 95% of the steel used was recycled.
- Old tyres found on the site were turned into bales and used in the landscaping.
- Habitats for newts, slowworms and butterflies were preserved.
- Three special bridges allow dormice to cross the road safely.

The road ahead

How can we future proof the infrastructure we need more efficiently? Paul Skinner, chairman of Infrastructure UK, talks to A²



Paul Skinner Chairman of Infrastructure UK

“Meeting the growing demands on our ageing infrastructure network is one of the biggest challenges we face,” says Paul Skinner, who chairs IUK – the body set up to advise on the UK’s long-term infrastructure priorities.

“Investment in infrastructure is essential for long-term economic growth, prosperity and competitiveness,” he explains.

“Transport, water, waste, energy and telecommunications are fundamental to increasing productivity, reducing business costs and creating new jobs.”

Last year, the World Economic Forum’s Global Competitiveness Report ranked the UK 33rd for the quality of its infrastructure, and 12th for overall competitiveness. In 2005 it was ranked ninth. This decline is a problem Skinner believes we urgently need to address.

“Over the past two centuries, the UK has developed extensive infrastructure networks,” he says. “But now, with increasing demand, and significant economic and environmental pressures, those networks are beginning to creak. In an increasingly global market, we need to maintain, renew and improve our infrastructure networks to remain competitive and attract investors to the UK.”

But making these improvements will not be simple, Skinner says. “Developing infrastructure for the future is being made more difficult by the environmental and financial challenges we are facing. Not only do we need to reduce carbon emissions, but we are currently

experiencing the most restrictive spending environment for a generation.”

“A £200bn investment in our economic infrastructure is planned over the next five years,” he continues. “And the demand for investment is likely to grow beyond that if we want to ensure businesses have the high quality infrastructure networks they need to be successful in a global marketplace.”

Skinner believes that meeting the size and scale of this investment challenge requires a change in the way we approach major infrastructure projects. “The government needs to provide clarity on the infrastructure we need. Then the public and private sectors can work together more effectively to provide the investment and resources that are required to deliver it.”

To encourage this approach, Infrastructure UK have announced the first ever National Infrastructure Plan (NIP), which sets out an integrated vision for infrastructure investment. “Investors seek stability and certainty,” says Skinner. “The NIP provides a long-term view of infrastructure investment and policy, which will help to encourage private sector investment.”

“The plan focuses on the infrastructure we need to deliver economic growth, and a low-carbon economy. And it looks at how we can maximise our infrastructure investment to deliver more with less. It’s essential that we prioritise making better use of our existing assets – large scale capital projects should only be considered as part of a clear long-term strategy.”

The NIP’s long-term effectiveness will be measured by tangible infrastructure

improvements that help to achieve economic growth. But Skinner highlights that the NIP cannot be used in isolation. “We must combine the NIP with more efficient delivery,” he continues. “Currently it’s more expensive to deliver infrastructure in the UK than in the rest of Europe, but this can change.”

Research by Infrastructure UK has shown that excessive costs often build up in the early stages of delivering a project – often caused by a lack of clarity and direction. The expensive stop-start nature of infrastructure delivery is largely a result of cyclical investment budgeting and planning. By addressing this, Skinner believes we could achieve savings of 15%. In financial terms, this would generate £2-3bn of savings each year.

But it is not just financial challenges we face in delivering future infrastructure networks – environmental challenges are also having an impact, as Skinner explains.

“To meet government targets for carbon emissions, a reliable, cost effective and low-carbon energy infrastructure needs to be built. The government’s electricity market reform consultation estimated that an investment of £110bn in electricity generation and transmission would be needed this decade to deliver secure, low-carbon energy supplies. That’s more than double the rate of investment in the last decade.”

“The overall scale of the infrastructure challenge is huge, but it also presents us with an opportunity,” Skinner concludes. “By encouraging investment and changing our approach to planning, we can deliver high quality infrastructure networks for the future.”

Going local

Leaders from around the UK discuss the infrastructure priorities for their regions

Infrastructure priorities

- Transport
- High speed broadband
- Energy



The South West

Tough economic times will drive the infrastructure innovation the South West needs, says Colin Skellett, chair of the West of England Local Enterprise Partnership

Infrastructure priorities

- Transport



London

How can we plan for the future? Michèle Dix, managing director of planning at Transport for London, examines the challenge of providing infrastructure for a growing population

“The infrastructure priority for London is undoubtedly the transport system,” says Dix. “The population in London is forecast to grow by 1.3 million people between 2005 and 2031. As a result, we expect the number of journeys each day to increase from 24 million to 27 million. Our challenge is providing the infrastructure we need to support this, with limited funding.”

“While Transport for London has secured funding for immediate infrastructure development projects, such as Crossrail, funding is not available to develop all the schemes needed to support growth. If we are going to accommodate future requirements, we will need more funds and more innovative ways of funding schemes with other partners.”

With limited funding options, maximising existing infrastructure is vital, believes Dix. “We are in the process of delivering

a large-scale upgrade to the tube network, which will increase capacity by 30%,” she says. “To support this, we are working with Government, National Rail and the train operating companies to make more of the suburban rail network and for it to be seen as an extension of the tube system. This will help to improve congestion and overcrowding.”

“To ease the traffic on London’s roads, we are introducing ‘more’ computerised systems to help control our traffic lights and improve reliability over an area i.e. Split Cycle Offset Optimisation Technique (SCOOT) tool,” continues Dix. “This links and controls traffic signals, automatically responding to fluctuations in traffic levels and prioritising certain movements. As a result, traffic flows more smoothly.”

Any new investments in London’s transport infrastructure are made with sustainability in mind, says Dix. “We have a challenging target to reduce CO₂ levels by 60% by 2025. To help us meet it, we’re investing in sustainable modes of transport, such as cycling and walking. We have created the Barclays bike hire scheme, and supported this with new cycle super highways – cycle lanes coming into central London from outer London.”

“We’re also using existing mechanisms, such as the congestion charge, to incentivise the take-up of low-carbon vehicles. And we’re developing cleaner buses which emit 40% less CO₂ than our current buses.”

“The population in London is forecast to grow by 1.3 million people between 2005 and 2031”

“Our focus is on getting the economy moving again,” says Skellett. “The priorities for driving economic growth are transport, high-speed broadband and power — in that order.”

“We need to ensure the five major transport schemes sitting with government are delivered. We also need a link from Bristol city centre to the airport. Gridlock is increasingly common and the cost incurred by the resulting delays are significant. We must ensure ports such as Bristol have effective links to the transport network.”

“lack of funding combined with the real need for improved infrastructure is driving innovation”

High speed broadband is another vital area, Skellett believes. “Bristol has a lot of creative businesses that thrive on high speed broadband access,” he says. “We must make high speed internet access a priority.”

In terms of power generation, Skellett points out that the region has diverse renewable energy resources. Offshore wind, wave and tidal power are growth areas, and analysis by the Regen sustainable energy agency estimates that it will be possible to generate between 15% and 20% of the energy consumed in the South West from renewables by 2020.

It’s innovation like this that Skellett believes will help the South West meet the challenges it faces. “The South West isn’t going to get significant new infrastructure assets in the short term,” he acknowledges. “But this lack of funding combined with the real need for improved infrastructure is driving innovation.”

“We’ve set a target to reduce carbon dioxide emissions in Birmingham by

60%

by 2026”

Infrastructure priorities

- Transport
- Energy



West Midlands

Improving transport links to open up the region – Jerry Blackett, chief executive of Birmingham Chamber of Commerce, highlights the link between infrastructure and the economy

“For the West Midlands, our greatest challenge is undoubtedly reversing the reduction in private sector jobs we have experienced over the last ten years,” says Blackett. “We need to invest in infrastructure like transport if we want to maximise our region’s economic potential. Our top infrastructure projects are transport and energy efficiency.”

Blackett believes new infrastructure will be vital. “With our current infrastructure already stretched, there is very little capacity left,” he says. “Refurbishing Birmingham New Street station will help to bring in more rail passengers, but it won’t increase the capacity for trains. The only way to deliver a long-term rail solution is with a new high speed rail station.”

“On the roads, we’ve used active traffic management to improve congestion on the motorway network. Now we need to replicate the success of the M42 corridor. With the National Exhibition Centre (NEC), Jaguar Land Rover plant, Birmingham airport and large business parks on either side, the corridor is out-performing every other area in the region.

To unlock the potential for further growth we need to improve the infrastructure inside the M42.”

Extending the runway at Birmingham airport is essential, says Blackett. “At the moment the runway is 400m too short for inter-continental flights,” he explains. “Once the extension plans are completed in 2014, we will be directly connected to more major global economies, including India and China.”

Infrastructure is also central to the region’s carbon reduction plans. “We’ve set a target to reduce carbon dioxide emissions in Birmingham by 60% by 2026,” says Blackett. “To help achieve this we are looking to roll out more electric cars, and install more charging points for electric vehicles.”

“We have introduced a £1.3bn energy-saving scheme, called Birmingham Energy Savers, which aims to end fuel poverty for 200,000 households through better home insulation. And we’ve installed a combined heat and power (CHP) scheme in the city centre. In addition, over the next five years, 50% of Birmingham’s streetlights will be changed to energy-efficient LED bulbs.”

“But for any future infrastructure development to be successful, we need to transform the public procurement process to encourage innovation,” argues Blackett. “We need to transform it so we develop long-term relationships between key organisations – like Arup – and the public sector. This is a fundamental piece of the jigsaw for developing the infrastructure we need.”

Infrastructure priorities

- Energy
- Transport
- High speed broadband



Wales

Wales needs to deliver more from its infrastructure with less money, says Russell Bennett, Head of Infrastructure Projects, Transport at the Welsh Government

“In Wales, our greatest challenge is delivering our key infrastructure priorities – energy, transport and high speed internet access – with less and less money,” says Bennett. “So we are looking to do more with the infrastructure we already have, particularly for transport.”

“We’ve just opened Wales’ first stretch of variable speed limit motorway, and we see that as a way to increase capacity and improve safety,” he continues. “On our rail network, we are lengthening platforms and improving infrastructure so we can increase service frequency and capacity. In particular, to help boost our economy, we want to reduce the journey time to London from South East Wales to less than two hours.”

Bennett points out that traffic improvements are helping Wales to meet its carbon reduction targets. “We have an opportunity to combine making our transport infrastructure work harder with becoming more energy-efficient,” he says. “Making best use of our infrastructure will help us meet our target to reduce carbon emissions by 3% every year.”

“As well as making improvements to our road network, the Welsh Government is supporting initiatives such as promoting walking and cycling, to help us deliver our sustainable objectives. We’re also investing heavily in our rail and bus services.”

But reducing CO₂ levels is not Wales’ only energy priority, Bennett explains. “Energy is about more than just the carbon agenda. We have ambitious targets for renewable energy, and we are looking at developing both onshore and offshore wind farms, as well as other renewable energy technologies. The challenge is getting public support for this, and developing the infrastructure we need to support it.”

“At the end of the day, with a limited budget it is more about winning hearts and minds than investing heavily in infrastructure.”

“Making best use of our infrastructure will help us meet our target to reduce carbon emissions by

3%

every year”

Infrastructure priorities

- Transport
- Waste



Northern Ireland

To improve its infrastructure network, Northern Ireland needs to find new models for funding, says Wendy Blundell, regional director at the Institution of Civil Engineers

“With a lack of funding and investment, major infrastructure development in Northern Ireland has come to a stop,” says Blundell. “Our over-reliance on public sector funding has got to end. It’s time to look at different funding models, and to re-examine our investment strategy.”

Finding new ways to fund infrastructure development represents a major challenge for the region, says Blundell. “There is a legacy of under-investment in infrastructure in Northern Ireland. We need to avoid returning to that, and prevent the stop-start nature of development we have seen in the past.”

Blundell is adamant about where investment should be targeted. “Our top infrastructure priorities are transport and waste,” she says. “So far, investment in transport infrastructure has focused on Belfast, to the detriment of rural transport.”

“Northern Ireland is one of the pilot regions for Plugged-In Places, an electric car initiative. We are in the process of

“European Union (EU) directives have highlighted the need to reduce the amount of waste we send to landfill”

putting the infrastructure in place, but with electric cars so expensive to buy, it’s hard to secure public support.”

“Indeed, one of the difficulties the region faces is its over reliance on cars,” Blundell continues. “Because of this, there has been significantly less investment in our public transport infrastructure. To reduce carbon emissions we need to direct more funding into our bus and rail network, extending it out of Belfast and into rural areas.”

“Looking at waste, the Reduce, Reuse, Recycle campaign has been very successful, and people’s behaviour has changed dramatically. But European Union (EU) directives have highlighted the need to reduce the amount of waste we send to landfill.”

New infrastructure can also help the region get more from its existing resources, says Blundell. “Northern Ireland has an abundance of renewable energy sources, such as wind and water,” she says. “The problem is we haven’t exploited these natural resources enough.”

“Wind energy is predominantly generated in the west of the region, but the majority of the population is in the east. If we can put the infrastructure in place to maximise these existing resources, they represent a great opportunity for development and private investment.”

Infrastructure priorities

- Transport
- Energy
- High speed broadband



The North

Developing sustainable infrastructure will bring economic benefits to the region, predicts Tom Riordan, chief executive of Leeds City Council

“For the North, developing our transport infrastructure is the biggest challenge” we face,” says Riordan. “This, along with energy and broadband are our top

“We have a target to reduce carbon emissions by

50%

by 2040”

infrastructure priorities.”

To achieve them we need to attract more investment to the region, believes Riordan. “We need to look at the potential long-term income that can be gained from this infrastructure development, and turn to investors across the world to help us fund it.”

“The North is pioneering carbon capture and storage (CCS),” he continues. “There is also the potential to harness offshore wind energy in the North, off the east coast of the region. This, together with CCS, would give us the opportunity to supply the green industry of the future, and bring substantial economic benefits.”

These infrastructure developments would also help the region to reduce its carbon footprint. “We have a target to reduce carbon emissions by 50% by 2040,” says Riordan. “To achieve this we are not only making changes to our energy infrastructure, we are making improvements to our transport network as well.”

“With better transport links we can encourage people to choose public transport, cycling and walking over their cars. This will enable us to reduce CO₂ levels and improve sustainability.”

“Achieving sustainability and economic growth is driving the need for transport infrastructure development,” continues Riordan. “In the North we have communities that are outside the mainstream economy – developing better transport links is the most effective way to change this.”

“To support our economy we also need to have better links to London. The plans to develop a high speed rail network (HS2) will deliver quicker and more efficient travel and bring significant economic benefits to the cities of the North.

But with HS2 still a long way off, Riordan believes the region needs to concentrate on making its existing transport infrastructure work harder. “In today’s financially constrained environment, we need to make more of

our existing assets,” says Riordan.

“So we are pressing for upgrades to the East Coast rail line to increase passenger and freight capacity. And we welcome the announcement of the Managed Motorway proposals for hard shoulder running on the M62 in our region, which will make journey times more reliable and reduce congestion. These plans will help us get more from what we already have.”

Infrastructure priorities

Energy
Transport
High speed broadband



Scotland

To grow its economy, Scotland needs to sustain investment in infrastructure, says Dr Lesley Sawers, chief executive of the Scottish Council for Development and Industry

“We have a huge opportunity to improve our infrastructure, but to do that we need to invest,” says Sawers. “The Scottish economy needs to move from consumption to investment. At present a larger proportion of Scotland’s economy relies on the public sector but with cuts being introduced we need to prioritise improving our infrastructure and economic growth.”

“Our top priorities are energy, transport and internet access,” continues Sawers. “Bringing high speed broadband to areas like the Highlands, and providing better links between our road and rail networks will improve connectivity for local communities. High speed rail is an important part of this. If we extend high speed rail into Scotland it will improve connectivity, bringing significant economic benefits.”

Improving transport infrastructure will help Scotland to make the most of renewable energy opportunities too, believes Sawers. “As well as setting a target to cut carbon emissions by 42% on 1990 levels by 2020, the Scottish Government also wants Scotland to

generate electricity equivalent to 100% of demand from renewable sources by then. If we are going to achieve this, we need to invest in ports and harbours infrastructure and transport infrastructure in more remote areas.”

“We also need significant investment in grid connectivity to ensure renewable energy supplies can be fed into the grid,” Sawers continues. “With no new nuclear power planned for Scotland at present, this investment in renewable energy infrastructure is essential.”

The challenge lies in funding the investment that is needed. “We have to make Scotland an attractive proposition for investors,” says Sawers. “If we can do that we will not only see economic benefits, we will be able to develop the infrastructure we need.”

“a target to cut carbon emissions by 42% on 1990 levels by 2020”

Infrastructure priorities

Transport
Energy
High speed broadband



Business

To improve infrastructure we need to look at long-term solutions, says David Begg, the publisher of Transport Times

“Large amounts of congestion and growing demand means that for business, transport is the top infrastructure priority – followed by energy and high speed broadband,” says Begg.

“Whether you look at roads, rail or airports, the UK has some of the most congested transport infrastructure in the developed world,” he continues. “Lost time increases costs for businesses,

“the price of oil is the second best option for changing travel behaviour”

and makes them less competitive internationally. And the lack of reliability and resilience of our transport networks just adds to these delays.”

But congestion is not only bad for the economy, it is also bad for the environment, says Begg. “Road congestion increases local pollution by 40%, because cars are travelling below their optimum speed. And it is not just on the roads that this happens – circling aircraft waiting to land also increase pollution levels.”

To constrain the growing demand for transport and improve congestion, we need to look at long-term solutions, says Begg. “Long-term planning and investment in transport infrastructure is the only way to avoid chronic congestion. We need to integrate land use planning and transport, because the location of businesses, people and homes affects the demand for travel.”

“At the moment people are living further and further away from their place of work, which is fuelling the demand for travel,” he continues. “Reversing this trend, and investing more heavily in transport infrastructure, will help to ease strain on our networks.”

As well as long-term planning strategies, Begg believes we need to manage demand through pricing. “Using pricing initiatives such as congestion charging and national road pricing, we can stem the exponential demand for travel. And the money levied through these initiatives could be used to fund much needed improvements to our transport infrastructure.”

“The problem is that both the public and politicians are generally against pricing measures,” he continues. “But the alternative to controlling demand is to have a level of spending on infrastructure that will be very difficult to sustain.”

“More immediately, the price of oil will almost certainly help to spur changes in travel,” says Begg. “If the price of oil remains as high as it is, location decisions will be influenced, the size of vehicles will change, and car sharing will increase. In some ways, the price of oil is the second best option for changing travel behaviour.”

