Horizon scanning

Range Finding
“The sector is at a pivot point: the strong are getting stronger while the very weak are under considerable threat. There could be carnage”
1 Introduction

Horizon scanning

Horizon scanning is a technique for looking ahead. Its focus is the future rather than the present and its purpose is to identify the issues that will be strategically important for Aberdeen in that future.

This is important for three main reasons:

- While it may be relatively easy to understand how the market for higher education will develop in the near future, the further forward the university looks the less clear it is likely to come. In order to anticipate and adapt to change, Aberdeen needs to build intelligence about the factors that are driving change in the long term;

- The range of factors - sometimes called drivers of change - shaping the future of higher education and the wider needs of business, political and society is wider and more disruptive than it has been in the recent past;

- Developments that are gaining traction in a range of adjacent markets - and which may seem peripheral or inconsequential for HE - may actually prove disruptive for higher education in the medium to long term.

Horizon scanning therefore needs to look across a range of sectors and developments to build a picture of change in adjacent markets as well as to identify changes that may seem more direct.

Looking at the future

Our approach to horizon scanning uses the three horizons model which illustrates how strategic issues change over time:

The present and the near future is defined in the model as Horizon 1 (H1). H1 issues are strategically important now. They are visible and well understood and are generally the issues that government and its stakeholders are already responding to. H1 issues are therefore the focus of current policy and strategy.
H1 issues will become less important over time. They may be assimilated into policy or strategy or they may be overtaken by other trends or events that are less important now but will become more important in the medium term - Horizon 2 (H2). Exactly how H2 will develop may not be apparent yet, but many of the key trends and factors – the change drivers - that will define it are already in play. The task for regulators, policy makers and strategists is to look at these issues closely, to explore the possible outcomes and to adapt policy and strategy in anticipation of future need. Ideally, this should be a collaborative process.

In the long term, H2 will give way to Horizon 3 (H3) and a new set of policy and strategy challenges will emerge. These, too, will require a response from policy makers, but the change drivers that will shape H3 are difficult to see in the present. It is not clear how H3 factors will develop, how they will interact or whether they will create opportunities or threats for stakeholders in the future. The task for regulators, policy makers and strategists here is therefore to identify and track the drivers that will shape H3. Doing so allows them to develop foresight about the strategic challenges and choices they might face in the long term future and to explore what kind of policy or strategy might be required to sustain success.

The main focus for horizon scanning and futures thinking is therefore the mid to long term: Horizon 2 and Horizon 3. The tools and techniques are designed to help policy makers identify the change drivers, to explore the various ways they might combine to change the future policy environment and to consider what the best policy response might be.

**Defining the time horizons**

There is general standard definition of ‘short’ ‘medium ‘ and ‘long’ term; the time frame for horizon scanning is defined on a project by project basis.

For this project therefore, we have broadly defined Horizon 1 issues as beginning to act on the market for higher education between now and 2025. They will not disappear post Horizon 1 but will continue to influence sector development. Horizon 2 issues will begin to bite between 2025 and 2035; and Horizon 3 issues between 2035 and 2040.

These are intuitive assessments and there will be value in discussing them further in due course.

**The locus of the scans**

Aberdeen is a higher education institution that operates within the global marketplace for higher education. The relationship between the university and its marketplace is dynamic; some actions that Aberdeen takes will have an Potential scale of impact on the shape of the marketplace and the choices that a range of actors in it - students, competitors, partners, suppliers, governments, for example - make. The reverse is also true; Aberdeen’s success is dependent in part on the choices, actions and strategic trajectory that students, competitors, partners, suppliers and government take.
Beyond the marketplace - the part of the external environment that the university probably pays most attention to - is the wider world. There are things happening here that may seem peripheral to higher education and to Aberdeen at the moment but which will, over the life of the coming plan and beyond, begin to shape the marketplace and the choices that actors make.

This horizon scan has picked up issues that are pertinent to all three spaces; the university, the marketplace for higher education and the wider world.
2 This document and how to use it

Structure

This document presents the first set of scans that we have prepared in support of the four Strategic Plan Workstreams.

There are five sections in this draft. Four correspond to each of the Workstreams and one (the first section) considers global changes that might have an impact on higher education directly or otherwise.

As well as setting out the issue relating to each scan, we have also included two additional paragraph headings:

• Potential implications for higher education in 2040
• Potential implications for Aberdeen in 2040

We have not filled these sections in since we believe there is merit in that being a joint activity; we will discuss that with you.

Relevance to the Workstreams

Although the issues are divided by individual Workstream, we stress that there is significant crossover of issues. Different Workstreams might place different emphasis on particular scans, but the entire document is relevant to each Workstream.

Diagnostics

Individual scans are colour coded according to our perception of their strategic importance to Aberdeen. It is important to emphasise that this colour coding is subjective on our part and designed to stimulate conversation; it is not an analysis of Aberdeen’s strategic ambition, its focus or its capability. In part, our colour coding depends on our view of how the particular issue may develop over the next few years.

Red indicates an issue or development that we suggest may be a potential threat

Orange indicates an issue or development that we suggest may be a potential disruptor

Yellow indicates an issue or development that may become more important as it develops and we suggest a watching brief

Green indicates an issue or development that we suggest may create a potential opportunity

For each scan we have also included an analysis (again subjective) of the potential scale of the impact on higher education and how certain the outcome is. On this latter analytic, it is important to emphasise that a low certainty score does not mean we do not believe the issue will have an impact; rather it suggests that the nature of the impact is less certain (or more uncertain).
### 3 Overview of the scans

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Potential threat, Potential disruptor, Watching brief, Potential opportunity
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Potential threat, Potential disruptor, Watching brief, Potential opportunity
## Global matters

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The issue

Climate change is a clear and present danger to our way of living and working.

- the IPCC’s Special Report on Global Warming of 1.5 °C published in October 2018 warns that the world has 12 years to limit climate change catastrophe and that we need to cut carbon pollution as much as possible and as fast as possible
- WWF’s Living Planet Report 2018, also published in October 2018, shows that wildlife populations have declined by over half in under fifty years. This is, says WWF, the last generation that can save nature
- the Committee on Climate Change’s report Managing the coast in a changing climate, published in October 2018 highlights that England will have to adapt to at least 1m of sea level rise within the next 80 years. This will place 1.6 million properties under risk and threaten infrastructure. Sea level rise will, of course, also affect the rest of the UK
- plastics pollution is at crisis point globally. 79% of all plastic produced ends up in landfills, dumps or in the wider environment - including the world’s seas. Single-Use Plastics: A Roadmap for Sustainability, a UN Environment report published in June 2018 highlights the scale of the problem globally and suggests a raft of policy responses to manage impact. China’s import restrictions on waste from the UK create an additional set of challenges for affected councils in the immediate future

Press coverage has been highly vocal about the need to act now. However, writing in Scientific American on 25 December 2018, Kate Marvel, a climate scientist at Columbia University commented that

You may have heard that we have 12 years to fix everything. This is well-meaning nonsense, but it’s still nonsense. We have both no time and more time. Climate change isn’t a cliff we fall off, but a slope we slide down [and] we can always choose to begin the long, slow, brutal climb back up….

It’s true that we’re not going to get utopia. The planet has already warmed by one degree Celsius. Most of the coral reefs are going to die, and many of the glaciers will melt…[We] don’t have to settle for dystopia. It’s going to be worse, but it doesn’t have to be bleak.

Potential implications for higher education in 2040

Some universities have already begun discussions on strategic, even radical, restructuring other business model to remain globally competitive in the face of climate change. The competitive imperative to respond is likely to increase significantly over the next 20 years.

Potential implications for Aberdeen in 2040

Source
IPCC, WWF, Scientific American

Date
October 2018 - December 2018

Author(s)
Numerous

Potential scale of impact

Certainty of outcome

Impact horizon
H1
H2
H3

Diagnostic
Potential THREAT
The global economic order in 2030?

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Potential scale of impact: ★★★
Certainty of outcome: ★★★
Impact horizon: H1, H2, H3

The issue

Global economic growth will be driven by emerging market economies, which will gradually increase their share of world GDP over time, leading to a doubling of the global economy by 2042. Growth will be at an annual average rate of around 2.6% between 2016 and 2050. The E7 economies - Brazil, China, India, Indonesia, Mexico, Russia and Turkey - will growing at an annual average rate of almost 3.5% over the next 34 years, compared to just 1.6% for the advanced G7 nations of Canada, France, Germany, Italy, Japan, the UK and the US.

We will continue to see the shift in global economic power away from established advanced economies, especially those in Europe, towards emerging economies in Asia and elsewhere. The E7 could comprise almost 50% of world GDP by 2050, while the G7’s share could decline to only just over 20%.

China has already overtaken the US to become the world’s largest economy in purchasing power parity (PPP) terms, while India currently stands in third place and is projected to overtake the US by 2050 in PPP terms. On this basis, the UK will fall to 10th place by 2050.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The issue

Competition for the right talent is fierce. And ‘talent’ no longer means the same as ten years ago; many of the roles, skills and job titles of tomorrow are unknown to us today. If current trends continue, within the next decade China and India will account for 40% of all young people with a degree in G20 and OECD countries, while the US and EU countries will account for just over a quarter. These countries are also producing more graduates in STEM subjects.

By 2030, if these trends continue, China and India will account for more than 60% of the OECD and G20 STEM graduates.

Government scope to invest in employment and education initiatives will be increasingly challenged by continuing fiscal pressures, with a trade-off between sustaining an ageing population and promoting opportunities for the young. As a consequence, there will continue to be a shift to the privatisation of education and training.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The issue

There is no doubt that robotics will have a major Potential scale of impact on the economy; but how remains a little hard to read. The current mood – perhaps exemplified by a 2017 report from the Centre for Economics and Business Research (CEBR) and a January 2018 report by the Centre for Cities – is that automation will deepen economic divisions across the country.

The Centre for Cities report suggests that 1 in 5 existing jobs in British cities are likely to be displaced by 2030 as a result of automation and globalisation – 3.6m jobs in total – with retail occupations, customer service roles and warehouse jobs among those most at threat. Cities in the North and Midlands more exposed to these job losses than wealthier cities in the South.

The RSA's Age of Automation report published in September 2017 aims to bring a more reasoned voice to the discussion of automation on jobs and the economy. One of the report's main conclusions is that AI and robotics are more likely to alter jobs than to eliminate them. Many tasks, it argues, remain outside the scope of machines to deliver; particularly those demanding manual dexterity and deeper forms of creativity and communication. A more important question is how AI and robotics will alter the substance of the many jobs that remain in place.

Seven in ten people in the UK are currently in jobs that are likely to need redesign and workforce retraining. New technologies like artificial intelligence and robotics will generate significant productivity gains and economic growth but will also change the nature of work. The supply of work for people leaving school with limited or no qualifications will decline significantly as jobs requiring limited educational attainment become fully automated and up to one third of work requiring a university degree could be automated by 2030.

This does not necessarily mean that one third of these jobs will disappear – but rather that one third of the constituent activities of most jobs will go. These changes will challenge current educational and workforce training models, as well as business approaches to skill-building. Mid-career job training and worker redeployment will be essential.

Much will come down to the choices we make as a society. However, as the RSA report argues, these choices will be largely irrelevant unless the UK accelerates its take-up of AI and robotics – an area where we are falling behind our main competitors.

Potential implications for higher education in 2040
Potential implications for Aberdeen in 2040
The issue

Growing the artificial intelligence industry in the UK, a report published by the UK Government in October 2017 suggests that AI could add an additional £630bn to the UK economy by 2035, increasing the annual growth rate of GVA from 2.5 to 3.9%. It also could increase spending power per household in the UK by up to £2,300 a year by 2030. The report makes 18 recommendations, 9 of which involve universities in improving the supply of skills or maximising the UK’s AI research. The Foreword notes that “We have a choice. The UK could stay among the world leaders in AI in the future, or allow other countries to dominate. We start from a good position in many respects but other leading countries are devoting significant resources to growing and deploying AI. The UK will need to act in key areas and to sustain action over a long period and across industry sectors, to retain its world leading status, and to grow our AI capability as well as deploying it much more widely. [The]UK has the expertise and the appetite to grasp the opportunity if we act decisively now.

In a follow up article in Wired in December 2018, Wendy Hall and Jerome Presenti highlighted the imperative for the UK to pool its resources -data, research results, skills and expertise – to achieve these results.

On 20 July 2017, China’s State Council issued the “Next Generation Artificial Intelligence Development Plan” (新新一代人工智能发展规划) which articulates an ambitious agenda for China to lead the world in AI. China stated its intention to pursue first-mover advantage to become the "premier global AI innovation center" by 2030. Through this new strategic framework, China plans to advance a “three in one” agenda in AI: tackling key problems in research and development, pursuing a range of products and applications, and cultivating an AI industry. The Chinese leadership aims to overtake the United States in the process.

An article in the Harvard Business Review in March 2018 indicated that, when looked at in detail, China’s plan is complicated and nuanced. “The most interesting thing is the depth of thinking, the breadth of thinking, from policy makers, research institutes, and tech companies,” said Jeffrey Ding, a student at Oxford University’s Future of Humanity Institute who studies China’s nascent AI industry and who translated the report says. “It vastly exceeds what I expected going in.”

China’s booming AI industry and massive government investment in the technology have raised fears in the US and elsewhere that the nation will overtake international rivals.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The issue

There is a long-standing gulf between productivity levels in the UK and its leading competitors, with the UK now 18% less productive than the average of the G7 countries. This matters because productivity growth drives economic growth over the longer-term; and, as the UK population ages, boosting productivity will become more challenging.

Recent employment growth has been skewed towards low productivity jobs and industries which has dragged down average productivity growth in the economy, as well as weakening earnings growth. However, low productivity growth may prove more durable, especially since it appears to be a common phenomenon across the advanced economies. Some commentators argue that we have entered an era of more or less permanently subdued productivity growth for essentially structural reasons. As a consequence, economic forecasts (themselves highly uncertain) expect that the average rate of productivity growth over the next 5 years (1.1%) is only just above pre-financial crisis levels. Beyond that period is highly uncertain, but certain structural weaknesses will provide constraints on the growth potential of the UK economy.

The other factor is that productivity growth is highly uneven in the economy, with definite winners and losers. Productivity growth among ‘average firms’ has stalled, partly due to slow rates of technological adoption, low investment, and weak management. While the top 1% of businesses have seen average productivity growth of around 6% per year since 2000, one-third of UK companies have seen no rise in productivity at all. Overall business spending on ICT, machinery and other equipment has hardly grown in real terms since 2000.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
Additive manufacturing

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The issue

Additive manufacturing (AM) is the collective name for technologies and process that build 3D objects by adding layers of material. AM is gaining a lot of publicity for high profile projects such as the 3D printed house that can be built in one day at low cost and Arup’s collaboration with CLS Architects in Europe. Future developments mean that houses will likely move from concrete to advanced hybrid materials. Designers are experimenting with smaller scale processes and using it to develop the technique.

The next wave of AM is exploring how to combine both structural and functional materials in the manufacturing process to create intelligent systems; and AM is likely to move into new industries such as agrochemicals, pharmaceuticals and electronics. Current research is exploring the use of AM to print human tissue. Siemens is building a 3D printing facility in the West Midlands which will develop the technology to print metal parts for the aerospace, automotive and power generation sectors (amongst others).

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The issue

Cryptocurrencies such as Bitcoin provide a secure system for storing and exchanging money on the internet. Cryptocurrencies are not regulated or controlled by any bank, government or centralised financial authority, and offers users a range of advantages over traditional banking (anonymity, secure transactions, low transaction fees and no forgery - to name a few).

Bitcoin, invented in 2009, was the first cryptocurrency but is not the only one. By the end of 2017, there were over 1,000 cryptocurrencies and significant volatility the market; largely because of continuing speculation.

A number of leading retail websites accept cryptocurrencies and they are now beginning to be accepted in the physical world too. There is even a small but growing network of Bitcoin ATMs in the UK.

Running counterintuitively (perhaps) to the provenance of cryptocurrencies, the Bank of England is currently investigating the possible introduction of a cryptocurrency linked to sterling. A Bank of England-issued digital currency would potentially allow British citizens to keep their money - in digital form - with the central bank itself, dispensing with the need for a retail bank. Big-ticket transactions, such as buying a house, could happen in nanoseconds.

Potential implications

The founders of Ethereum, a leading cryptocurrency, fund a research lab (one of two globally) at Edinburgh University that focuses on blockchain technology; other universities, including Oxford and Cambridge, are introducing courses in the technology. A news report in the San Francisco Chronicle on 5 June 2018 indicates that US universities are starting (tentatively) to invest in cryptocurrencies.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The issue

The UCL (University College, London) Constitution Unit is exploring options for an English Parliament. Any move outside London would require relocation of English government departments and UCL proposes that a national competition might be the best way to resolve any jealousies over which city might be chosen as the location. Where - if the political institutions of the UK begin to change - might it end? An article in the FT in November 2017 imagining post Brexit London as a city state may (or may not) have been tongue in cheek but it follows a 2016 petition calling for Sadiq Khan to declare London independent.

In Scotland, opinion on independence remains unchanged since 2014 according to a June 2018 survey conducted for The Times by YouGov: 55% in favour of the union and 45% in favour of independence. Some reports suggest that interest in independence - and even a Scottish currency - is going again.

Plaid Cymru would hold a referendum on independence if it got in to government in Wales according to Carmarthenshire AM Adam Price. That might be a bold move. While 44% of the Welsh electorate reportedly want an assembly with greater powers, there remains little appetite for Welsh independence currently, with support running at only 7%.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040

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The issue

Shell Global’s most recent scenarios for the future are the New Lens Scenarios, which explore two possible ways the 21st century could unfold with dramatically different implications for society and the world’s energy system.

There are consider two possible scenarios of the future, each taking a number of pressing global trends and issues and using them as “lenses” through which to view the world.

The scenarios provide a detailed analysis of current trends and their likely trajectory into the future. They dive into the implications for the pace of global economic development, the types of energy we use to power our lives and the growth in greenhouse gas emissions.

Mountains, the first scenario, describes a world with power locked in and held tightly by the currently influential. Stability is the highest prize: those at the top align their interests to unlock resources steadily and cautiously, not solely dictated by immediate market forces. The resulting rigidity within the system dampens economic dynamism and stifles social mobility.

In Oceans, the second scenario, influence stretches far and wide. Power is devolved, competing interests are accommodated and compromise is king. Economic productivity surges on a huge wave of reforms, yet social cohesion is sometimes eroded and politics destabilised. This causes much secondary policy development to stagnate, giving immediate market forces greater prominence.

The two scenarios also highlight areas of public policy likely to have the greatest influence on the development of cleaner fuels, improvements in energy efficiency and on moderating greenhouse gas emissions.

They also raise surprising questions. For instance, could photovoltaic solar power become the world’s largest energy source by the 2070s? Might global carbon dioxide (CO2) emissions be near zero by 2100, thanks partly to technology that removes CO2 from the atmosphere?

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The world has 12 years to limit climate change catastrophe. Trust in the UK’s future. Urgent need to focus on skills and lifelong learning.


Jobs lost, jobs gained. Community relationships with universities are becoming fragile. The impact of AI on business and education.


Additive manufacturing. Weeding out hate crime.

Following the money. Addressing sexual violence.

Independent thinking. Drugs: Where’s the harm?

New lens on the future.
The issue

In January 2017 Edelman, a global communications marketing firm that carries out an annual trust barometer survey identified a sharp drop in trust in the British government, from 36% pre Brexit referendum to 26% by early 2017.

The 2019 Barometer reveals a worsening picture that suggests the UK feels betrayed by politics and politicians, is anxious that we are travelling in the wrong direction and that the populace have a hunger for more fairness in society.

The key findings show:
• Since Brexit 4 in 10 Britons feel others are more likely to take part in violent protest
• 69% of us say our fellow citizens are angrier about politics and society since the referendum
• 1 in 6 of us have fallen out with relatives or friends over the issue of leaving the EU
• 6 in 10 Britons believe Government doesn’t listen to “people like them”, regardless of whether they supported remain or leave in the referendum
• Two-thirds of us believe the country is on the wrong track
• 7 in 10 Britons feel that life is unfair
• Both Theresa May and Jeremy Corbyn have suffered significant falls in trust

Things are likely to get worse. Paul Johnston, Director of the Institute for Fiscal Studies (IFS) says the UK is nowhere near out of austerity and there are still big spending cuts and big social security cuts to come. Government borrowing has come down from about 10% of national income to 2% but Britain still runs up extra debt of £40bn a year. The national debt - approaching £2tn - equates to around 90% of GDP. If interest rates climb and UK debt goes up, there’s a question about when institutions will stop lending to Britain. Johnson suggests it is time for politicians to level with the public about the financial challenges facing the UK. He says both of the main political parties are living in a fantasy world.

Potential implications for higher education in 2040

Potential implications for Aberdeen in 2040
The issue

The Industrial Strategy sets out the UK Government's plan to help businesses create better, higher-paying jobs by investing in the skills, industries and infrastructure of the future - and sets out a policy framework against which major private and public sector investment decisions can be made to support its implementation. The Strategy is built on five foundations - ideas, people, infrastructure, business environment and places - and organised around four ‘Grand Challenges’ (artificial intelligence and the data revolution; clean growth; healthy ageing; and the future of mobility). It shows a clear recognition of the role that universities have to play in improving the UK's productivity performance and increasing economic growth. Investment in R&D is a key part of the strategy for tackling the productivity challenge, with an ambition of increasing total R&D investment to 2.4% of GDP by 2027, and 3% in the longer term.

One year on, the broad consensus among business lobby groups and industry executives is that progress has been made with the industrial strategy. But more work needs to be done, notably to develop workers' skills and to boost the productivity of small and medium-sized businesses.

There are, of course, implications for university funding.

Making sure the Industrial Strategy works in Scotland and contributes to achieving Scottish Government’s priorities around inclusive economic growth is going to be important. The Scottish Government needs to make sure the consequential funding from increases for English HEIs for research and innovation come to Scottish HEIs to enable them to leverage in more investment in research and innovation in Scotland from UK, business and international sources. It also need to stimulate business demand for innovation and for working with universities to make the most of the Scotland’s world-leading research in the grand challenge areas

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An increasingly unequal society

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The issue

A 2017 study by the Joseph Rowntree Foundation and Institute of Fiscal Studies (JRF and IFS) predicts that continuing slow earnings growth and rising inflation over the coming years, combined with planned tax and benefit changes, will only lead to modest growth in average income. However, these changes will lead to no growth in income for low-income households, and actually result in a rise in child poverty. For the worst 15% of households, real incomes after deducting housing costs are projected to be lower on average in 2022 than in 2014. The IFS’s projections show that relative child poverty is set to increase from 30% to 37% by 2022, rising to over 5.2mn children 2021/22.

Any projections relying on macroeconomic forecasts come with substantial margins of error, particularly when the macroeconomic and policy environment is as uncertain as it is now. The future path of real earnings (encapsulating both incomes and inflation) is an important source of uncertainty. What is notable, though, is that even in a high earnings growth scenario, overall absolute poverty falls only slightly, and absolute child poverty still increases.

The path to 2030 is likely to see a further real-terms reduction of household incomes whilst inequality between households and regions in the UK becomes more marked. If recent UK trends continue, the proportion of national income accounted for by the highest 0.1% of earners will increase from 5% to 14% by 2030.

In a February 2019 blog post, JFS points out that a growing employment rate is no longer helping families out of poverty as it once did, and people in many parts of the country are locked out of opportunities to access good jobs. In-work poverty has been steadily rising and one in eight workers now live in poverty. To loosen the grip that poverty has on people’s lives, it argues, society can no longer rely on previous assumptions that prosperity will trickle down. A growing body of evidence is showing, simply driving up output growth and number of jobs in an economy are not guaranteed to improve living standards for people in or at risk of poverty. This is why the UK needs inclusive growth.

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Speaking at the British Academy on 5 June 2018, Meric Gertler, president of the University of Toronto, suggested that the rush to open international branch campuses has undermined universities' relationships with their local communities. His speech came at the same time as the University of Durham appointed its first community liaison officer in a bid to ease mounting tensions over the university’s expansion plans for the next decade.

Relationships between universities and local communities have been quietly growing fragile for some time now. One reason is the impact of rising student numbers affecting property prices and availability for local residents. In St Andrews, such ‘studentification’ is causing problems for local citizens to such an extent that there is now a growing possibility of calls for action to restrict the growth of student numbers at the university. Of course, such calls are unlikely to be successful - for a whole range of reasons - and this creates a second challenge for universities: being seen as faceless and uncaring businesses that are only interested in their own expansion. As in Durham, resident groups in London, Cambridge and Coventry have all expressed concern about local expansion plans and the crowding out of local communities - sometimes suggesting that universities are no longer interested in being part of those communities at all.

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Research by the NUS carried out in 2015 found that eight out of 10 UK students said they experienced mental health issues during the previous year. Half of the students did not seek help. A third (at that time) said they did not know where to get mental health support from.

Data from the Higher Education Statistics Agency (Hesa) revealed that a record 1,180 students who experienced mental health problems left university early in 2014-15, the most recent year in which data was available. That represents a 210% increase from 380 in 2009-10.

94% of universities have experienced a sharp increase in the number of people trying to access support services, with some institutions noticing a threefold increase. Providing effective mental health support is part of a duty of care.

Data obtained by the Guardian in 2017 showed that some universities are cutting back on the number of counsellors they employ, or are not recruiting more to meet the rise in demand.

Old news? Maybe. Sorted? Definitely not. A mental health survey of UK universities, published in March 2019, polled 37,500 students; 50.3% reported self-harm, 87.7% struggle with anxiety, and 75.6% conceal their symptoms from friends.

Jisc's Horizons report, launched in March 2109 addresses the mental health challenge in detail, offering suggestions for how technology may help better support students and staff. Learning analytics are increasingly being used to support students, identifying those at risk and enabling early intervention.

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In August 2017, a report by RAND Europe, titled *Understanding Mental Health in the Research Environment*, claimed that the majority of university staff find their job stressful, with levels of burnout comparable to those among “high risk” groups such as healthcare workers.

Some 37 per cent of academics reported a mental health disorder, while more than 40 per cent of postgraduate students reported depression symptoms, emotional or stress-related problems or high levels of stress, according to the report, which was commissioned by the Royal Society and the Wellcome Trust and was based on a literature review of 48 studies in this area.

In September 2014, pressure to secure grant money apparently led Stefan Grimm, a toxicology professor at Imperial College London, to take his own life. He had received a letter earlier that year informing him that he was “struggling to fulfil the metrics of a professorial post” and needed to win research grants worth £200,000 a year.

One month after his death, colleagues at Imperial were shocked to receive an email purportedly sent by the scientist himself. It was titled “How professors are treated at Imperial College” and read: “This is not a university anymore but a business”, where “the rest of us are milked for money, be it professors for their grant income or students who pay £100 just to extend their write-up status”. In the wake of Grimm’s death, Imperial ordered an internal review of its staff policies, which recommended several changes. These included providing improved support for those facing performance management assessments, which can also take in the number and publication venues of papers each academic produces, as well as the number of PhD students they have supervised.

Higher education staff report worse wellbeing than those in other types of employment. Only 1 in 6 academics discloses mental health issues to their employer. Job insecurity is a key issue for those working in the research environment, particularly early-career researchers who are often employed on successive short-term contracts.

### Potential implications for higher education in 2040

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Racism and hate crime is reportedly on the increase. Analysis by *The Independent* found that 129 alleged incidents of racism were reported to UK universities in 2017, compared to 80 incidents in 2015 – a rise of 61 per cent. One concerning fact is that newspaper reports of racism or sexual violence often contain a version of the phrase “…but often students do not tell their university as they fear they will not be taken seriously…”.

*The University of Huddersfield is undertaking a £100,000 research project* which aims to ensure hate crime cannot take root on UK campuses. Although the University currently has no actual reports of hate crimes - in common with many universities across the UK - research has shown that victims often fail to report it.

The goal of the project is to investigate and dismantle any barriers that might hinder the reporting of crimes or incidents motivated by factors such as race, gender or disability. One of the outcomes is expected to be the establishment of a single recording and reporting point. The work will also be disseminated across the university sector.

An important element of the project will be recruitment of 20 students who will act as peer educators on campus and online. They will speak with fellow students, possibly run some training programmes and also be active in the digital space. It is possible that an online hate crime reporting tool will be developed, but this will be discussed during the planning phase at the start of the project.

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Almost two-thirds of students and graduates at British universities have experienced sexual violence, according to research conducted by campaign group Revolt Sexual Assault and The Student Room. They spoke to just under 5,000 current and past students, both male and female, from more than 150 UK institutions and found that 62% (70% of female and 26% of males) experienced sexual violence at British universities. Only 6% reported their experience to the university, and just 10% to police. More than half said they didn’t feel it was serious enough, while 35% said they felt ashamed. Only 2% of those who experienced sexual assault or harassment both reported it to their university and were satisfied with the process.

A spokesman for Revolt Sexual Assault said: “We want to see a uniform national response to what now must be recognised as a nation-wide issue – an enforced and consistent standard of care implemented across the higher education sector, with student survivors at its heart.”

In response, a spokesman for Universities UK said the findings showed there was “work to do” to tackle the problem.

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In September 2017, the Duke of Cambridge visited a charity in London that supports recovering addicts and asked them if they thought the law on illegal substances should be changed. “It feels like a question I have to ask,” the Duke is reported to have said. The UK is the leading country in Europe for deaths from drug overdoses, and many believe that the current drug policy is not working. Criminalisation appears to have failed – but efforts to cultivate fresh thinking are getting nowhere.

A 2016 study argued that cannabis legalisation and regulation is 'now inevitable' and called on the UK to emulate the market-based approaches emerging in North America. A legal cannabis market could be worth £6.8bn in the UK and net as much as £1.05bn for the Treasury.

The authors of a paper published in February 2019 - Association of Cannabis Use in Adolescence and Risk of Depression, Anxiety, and Suicidality in Young Adulthood: A Systematic Review and Meta-analysis have identified about 60,000 cases of depression in adults under 35 in the UK, and more than 400,000 in the US, that could be avoided if adolescents did not smoke cannabis. An Independent Review of Drugs and Crime, announced by the Home Office in February 2019, has explicitly put consideration of legal reform out of scope. However, the appointed chair, Dame Carol Black, has said she will look at the experiences in Portugal, Canada and other countries that have embarked on reform.

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## Interdisciplinary workstream

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The issue

Too many young people are leaving education without capabilities that business requires – in a recent CBI and Pearson survey on Education and Skills, two thirds of employers raised concerns about future skills needs.

Further reform to the UK skills system is necessary to boost UK competitiveness and ensure young people and adults are set up to succeed in the future world of work. Putting the right system in place could unlock an annual £22 billion competitiveness dividend.

The Commission’s report provides a set of recommendations for enhancing the education & skills system to put it one step ahead of the needs of the economy, and calls for an immediate focus on:

- Ensuring the right provision and flexible pathways are available to give individuals the skills they will need to flourish in a rapidly changing economy. 14 to 16 year-olds need broader options, and three clear pathways for 16 year-olds need to offer a choice between an academic route, a career-focused route, and a route to a particular occupation.

- Creating opportunities that stimulate and enable lifelong learning. There are five generations in the workforce today, and two thirds of the 2030 workforce have already left full-time education; lifelong learning is required to enable ongoing employability. An easily accessible online portal for employers looking to find learning experiences and training should be created, and an all-age career advice and guidance needs to be in place.

- Invest further and differently in our education system. Government should invest more and differently in education; all individuals should be entitled to government-supported provision up to level 3, and a target should be set for education spending to be a percentage of GDP, including raising 16 to 18 funding per student by 5% a year for five years from 2019 which would bring us into line with the OECD top quintile average. A broad set of measures should be in place to encourage employers and individual to invest more. These include a tax rebate scheme for both employers and individuals, and personal training accounts for the low-waged.

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National population projections for 18–20 year old UK citizens show a 10% decrease in the number of 18–20 year olds (more than 230,000 young people) between 2014 and 2021, followed by an increase of 19% between 2021 and 2030. The number of young people in the population will return to 2014 levels (2.4 million) by 2026 before increasing sharply between 2026 and 2030. Reflecting this trend, the number of people applying for UK university places in 2017 fell by more than 25,000 (4%) over 2016, although there was a marked difference between Scotland and the rest of the UK, perhaps due to the funding regime:

- 437,860 applications from students in England - down 5% from 459,430 last year
- 48,940 from Scotland - down 1% from 49,470
- 22,530 from Wales - down 5% from 23,740
- 20,290 from Northern Ireland - down 4% from 21,110

The number of EU students planning to study in the UK fell by 5%. There has also been a significant drop in mature students, leading for calls for universities and colleges should look to do what they can to reverse the decline in mature student applications, as a matter of urgency.

While the Department for Education has made the point that the number of 18-year-olds applying for university was at record levels in 2017, the reality remains that the increase is not sufficient to sustain student numbers in the UK overall. Some courses that rely on bursaries have been particularly hit since their abolition. With public sector costs set to rise significantly in light of the health and social care costs of an ageing population, sustained levels of public funding to the sector may not be guaranteed. And, while Scotland’s sustained free tuition for EU Students may act in its favour, overseas students may not distinguish between Scotland and the wider UK cultural and attitudinal issues surrounding Brexit

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There is considerable interest in how blockchain, one of the technologies that underpins cryptocurrencies, might transform education. Blockchain is used to create a ‘digital ledger’ that tracks buying and selling of goods and services, of who owns those goods and services and of what their provenance is. Unlike the centralised database of, say, a bank, there are multiple versions of this ledger stored on computers around the world, meaning that it is much harder to hack and alter; and much easier to corollate and corroborate authenticity. The idea is that this creates security and trust, and cuts out the need for a middleman - a trusted organisation, say - to validate transactions.

Higher education is experimenting with ways that blockchain can be used. For some, blockchain is a useful way of cutting administrative costs and making degree records more secure. More ambitiously, some suggest that blockchain could hasten the dissolution of universities as institutions and help to usher in a system whereby academics validate students' knowledge directly.

In February 2019, the United Arab Emirates University released UAEU Passport, blockchain applications for digital academic records to all students and alumni across the university. UAEU is the first institution to go live on such a large scale.

Educhain, a Dubai based blockchain company that enables academic institutions to issue official academic credentials and automate their verification is working with a range of institutions internationally.

A group of academics from Oxford aim to set up Woolf University, a blockchain based institution. Woolf will not have a physical campus and will instead be based around an app that allows academics to advertise their expertise to prospective students, who can in turn select modules to suit their needs and interests. Blockchain will be used to regulate contracts and payments and also to record academic achievement. In time, students will be able to acquire credits towards undergraduate degrees, which will be placed on the blockchain and be accredited by traditional higher education institutions. Woolf's aim is to allow academics to take control of their employment and to lower tuition fees for students.

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In March 2018, the Government launched its Sector Deal for Artificial Intelligence to take "immediate, tangible actions" to advance the UK's ambitions in AI and the data-driven economy. The Sector Deal outlines a package of up to £0.95 billion of support for government, industry and academia.

In a special report published in March 2018, The Economist focussed on how AI is beginning its journey out of the lab and into business. Johnson & Johnson, a consumer-goods firm, and Accenture, a consultancy, use AI to sort through job applications and pick the best candidates; Caesars, a casino and hotel group, use it to guess customers' likely spending and offer personalised promotions to draw them in. Bloomberg, a media and financial-information firm, uses AI to scan companies' earnings releases and automatically generate news articles. Vodafone, a mobile operator, can predict problems with its network and with users' devices before they arise. Companies in every industry use AI to monitor cybersecurity threats and other risks, such as disgruntled employees; Amazon uses AI widely for tasks such as guiding robots in its warehouses and optimising packing and delivery, as well as detecting counterfeit goods and powering its speaker, Alexa. Alibaba, a Chinese rival, also makes extensive use of AI, for example in logistics; and its online-payments affiliate, Ant Financial, is experimenting with facial recognition for approving transactions.

As AI spreads beyond the tech sector, it will fuel the rise of new firms that challenge incumbents. This is already happening in the car industry, with autonomous-vehicle startups and ride-hailing firms such as Uber. But it will also change the way other companies work, transforming traditional functions such as supply-chain management, customer service and recruitment.

Despite developments in industry, continued reports suggest AI is having limited impact on higher education. A recent paper - Exploring the impact of artificial intelligence on teaching and learning in higher education - suggests AI offers new openings for education for all, while fostering lifelong learning in a strengthened model that can preserve the integrity of core values and the purpose of higher education. The paper explores ethics, the changing roles of teachers on learning pathways and a new set of graduate attributes -such as imagination, creativity, and innovation that are unlikely to be replicated by machines.

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A March 2016 article in EdTech considers how the Internet of Things (IoT) will reshape higher education. The article doesn’t touch teaching or research but focuses on how IoT will impact professional services – or business delivery to put it another way.

It points out that IoT will enable institutions to begin deploying connected security equipment, such as cameras, access controls, locks and other monitoring devices. IoT-enabled classroom technologies will be upgraded and repaired remotely and timeously (and, of course, not necessarily from the same campus, city or even country in which the university is located). Facilities maintenance will benefit from the IoT’s monitoring and control capabilities, as higher ed institutions install technologies such as smart HVAC systems and water and energy meters that can not only streamline repairs but also lower resource consumption.

However universities decide to incorporate the technology, IoT is sure to rapidly alter business processes. For that reason, universities should consider proactively adjusting their change management programmes and providing training and professional development opportunities that will help staff evolve with the new technology.

Improvements to campus infrastructure will also be instrumental to IoT success. From the sensors involved in facilities maintenance to the smart TVs sitting in students’ dormitories, connected devices are producing vast amounts of data every day. That information will only expand as the technology matures and smart objects move from tracking raw data to reporting higher-level insights.

Universities can prepare for this influx of data by moving from on-premises storage solutions to the private or public cloud. Leaning on the expertise of technology partners can help IT decision-makers better identify options that will not only expand the institution’s storage capabilities but also lower its costs and promote mobility. And making the move early will create competitive advantage for universities that can exploit the full value of the IoT, once the technology comes to bear.

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Scotland has proportionally more EU students on our college and university campuses than other parts of the UK, while EU nationals make up a quarter of research staff. The Scottish government has launched the Stay in Scotland campaign to offer practical support to EU citizens living here in the run up to Brexit, and to reiterate that it values the contribution they make to our communities.

The proposed "no deal" migration policy, allowing a temporary leave to stay for three years, ignores the fact that the majority of undergraduate courses in Scotland last four years. To then suggest that EU students could apply for a visa for a further year to complete their course – at a cost of up to £840 – is, according to the minister, simply outrageous and put Scottish institutions at a serious disadvantage when competing to attract EU nationals.

For students wanting to go abroad to learn, it’s also a disaster. Proportionally more Scottish students take part in the Erasmus+ exchange than other parts of the UK. Scotland’s continued participation in the scheme, particularly in the event of "no deal", threatens all students involved in work or study placements across Europe.

Since Horizon 2020 launched in 2014, almost €600 million of funding for research and innovation has been secured by Scottish organisations. But latest figures are worrying – the total share of UK and Scottish participations in Horizon 2020 projects is falling. Researchers suggest that EU partners who would have previously wished to collaborate are avoiding doing so now, due to ongoing uncertainty. European Social Fund (ESF) programmes are also under threat. Jointly delivered by the Scottish Funding Council and the EU, they have provided additional student places at colleges, and some universities, for upskilling and supporting young people not yet in employment, education and training. In 2017-18, £14 million of funding was match-funded by ESF programmes.

The minister intends to convene a second joint-sector Brexit Summit in May to consider how Scottish institutions can work together to respond to the challenges of Brexit.

**Potential implications for higher education in 2040**

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The issue

A move to formally incorporate short courses into Australia’s qualifications hierarchy could help meet an industry need while discouraging universities from churning out an unwieldy mishmash of micro-credentials.

A new discussion paper from The Expert Panel for the Review of the Australian Qualifications Framework offers qualified support for the inclusion of short-form study programmes, from enabling courses and vocational “skill sets” to micro-master’s and massive open online courses, in the Australian Qualifications Framework.

Ian Jacobs, vice-chancellor of the University of New South Wales, said that the proposals were timely as institutions around the country developed suites of mini-courses.

He said that the panel was focusing on the same sorts of issues that UNSW was grappling with as it constructed its own mini-credentials, such as how to maintain academic standards and meet regulatory and industry requirements. “Rigour and quality is crucial, so that students know what they’re getting,” Professor Jacobs said.

The paper outlines the types of short credentials that could be incorporated in the AQF, and the technical hurdles that would need to be addressed – including how their quality could be assured, and where they could be assigned on the qualifications ladder.

It notes that Denmark, the Republic of Ireland and Scotland have successfully tackled such questions, and that New Zealand was considering following suit. It also outlines the advantages of recognising short courses in the AQF, particularly around questions of credit. “Employers and workers are looking for credentials that are affordable and timely, that can help people to retrain and upskill as the workplace changes,” it notes.

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## 5 International workstream

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Across the higher education sector, aspirations to internationalise the student body, transform approaches to education, increase student recruitment and generate revenue are all on the agenda. Once, universities might have been able to do all of this on their own. But it looks less likely as we move towards a digitally integrated future. Evidence-based pedagogical approaches for online education mean that very high quality engaged learning is now available at scale. But making the right choices of technologies and deploying them effectively requires effective partnerships and collaborations with providers.

The author discusses a new type of partnership – fusion – that allows collaborating institutions to blend different components or elements to create something new. She suggests six aspects of fusion that will create success in the future for university partnerships:

- **Pedagogy**: New curricula and pedagogical 'design and build' methodologies ensure full engagement for all contributors – academics, educationalists, information and technology specialists. Confidence and trust can be built through joint design and shared development, leading to transformational thinking and exceptional outcomes for students.

- **Resources**: Manage and commit resources (of all kinds) to the partnership.

- **Trust**: Nurture each other for the good of the whole – trust doesn’t come as naturally as many think. Both parties lend their weight (strengths, special attributes and distinctiveness) and their efforts to lift a mass they could not move on their own. Effectiveness is about applying the needed effort at the correct distance along the lever. Joint workshopping enables creative, open problem solving, relationship building and emergent idea generation.

- **Capability**: Appoint and enable people who have the capability to operate across organisations and roles and who can rally sustainable commitment, function across lines, problem solve, foster constructive enthusiasm and lead to action. Clarity for communication lines and accountabilities are crucial.

- **Structure**: Set up a transparent hierarchy of integrated strategic and operational formal groups, with clear purposes, roles and terms of reference. Be aware that embedded in both organisational cultures are a mass of procedures and decision cycles will be out of sync at the beginning.

- **Prototypes**: Recognise that very small scale ‘hopeful pilots’ are rarely successful in scenarios of this level of scale and complexity. Better ways of going beyond proofs of concept are through prototyping, to demonstrate how things can be done. It’s best to aim for modest but achievable outcomes whilst assembling for more ambitious, scalable sequels.

**Potential implications for higher education in 2040**

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*University of Aberdeen Scans: Range Finding Draft*
The issue

This article argues that universities can thrive post-Brexit if Government delivers on four policy priorities:

**An ambitious international education strategy**

A comprehensive international education strategy to grow the number of international students. This should include improvements to post-study work visas so graduates can live and work in the UK for a defined period following graduation. It should also be coupled with a significant and sustained campaign to encourage international students to choose the UK, counteracting the less than welcoming impression of recent years.

**An immigration system that recognises the value of international staff and students**

An immigration system that enables students to enter the UK to study with minimal barriers and universities to recruit talented staff with minimal bureaucracy. The current tier 2 and tier 4 visa arrangements need urgent reform if UK universities are to attract talented European staff and students that contribute so much to our campus communities, our research, our teaching and our economy.

**Support to grow international research collaboration**

European research programmes enable access to a multinational, pooled financial resource that is essential for collaboration – and incentivises it. The Horizon Europe programme offers globally-recognised prestige, enabling access and exposure to networks and contacts that encourage further collaboration. It also provides a single framework for collaboration, and operates within a common regulatory framework. Future free trade agreements will present opportunities to enhance international collaboration on research and education. The university sector needs to be clear about what the priorities are for each country the UK government may seek to enter into a free trade agreement with.

**Support to grow outward student mobility**

UK students and staff need to pursue international experiences that directly benefit their academic performance and their wider employability, while enabling them to build international networks. Building international experience will be an important way of growing the skills and experience necessary for the UK to be a global trading nation.

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Education for global citizenship has become a popular concept worldwide. There are, consequently, many examples of good practice worldwide, including the Council for Global Citizenship Education in India; the High Resolves secondary schools initiative in Australia; the Developing the Global Dimension in the School Curriculum report published by the Department for Education and Skills in England; the Activate Network for young people in South Africa; and Peace First, an NGO based in the United States and Colombia.

Universities need to ask what being either global or international might actually mean in terms of their curricula. On the one hand, being international means being able to incorporate international and linguistic diversity dimensions into the curriculum as well as teaching and learning processes and support services. On the other hand, being global in curriculum terms is a broader ambition since it should enable students to gain a better understanding of the world in which they live so that they are able to create something better and more peaceful through intercultural understanding and respect, and so that they can think of the world as being just one nation rather than many different nations.

In exploring this distinction, the author suggest the concept of citizenship of a university is significant. If the university, as an entity, belongs to a specific place, he suggests its citizenship belongs to that place, so for example, the citizenship of the University of Barcelona is Barcelona/Spain/Catalonia. In contrast, if the citizenship of a university is, for example, Spanish, but it is internationally diverse, having staff and students of many nationalities from different parts of the world, this university a Spanish university with international diversification.

By contrasting different concepts of citizenship, he suggests distinguishing between four categories of university: those that are global, multinational, international or national. This categorisation is increasingly important for understanding the competitive positioning and strategic trajectory of individual universities.

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A report by Aberdeen City Council published in November 2018 highlights the outlook for the city and the region into the 2020s.

Key findings include

- Consistent evidence of cautious optimism and signs that economic conditions are gradually improving
- GVA per head in Aberdeen remains the highest in Scotland
- The region continues to perform strongly in export markets, with around 21% of the value of Scottish exports coming from the North-east
- Emerging signs of improvement in the labour market, with employment rates recovering and rising from 70% in Aberdeen in 2016 to 76% in 2018
- The first rise in the number of jobs being supported by the UK offshore oil and gas sector since the downturn in 2014, increasing to 282,700 in 2018 from 280,000 in 2017
- Stability returning to the local property market, suggesting the decline in house prices may have bottomed out
- Independent growth forecasts of between 1-1.5% per annum until 2020, against the Scottish range of 0.85-1.7% and the UK range of 1.4-2.0%.

The report is positive overall, while noting challenges on a regional and national level relating to Brexit, that ageing population, technological change, productivity, the future of oil and gas, inclusive economic growth and inward investment.

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The UK government announced in July 2017 that it would ban all new petrol and diesel cars and vans from 2040 amid fears that rising levels of nitrogen oxide pose a major risk to public health. Ministers suggested NOX poses the largest environmental risk to public health in the UK, costing up to £2.7bn in lost productivity in one recent year. With two days, the National Grid raised concerns about its ability to cope with the potential 50% increase in electricity demanded by electric vehicles (EVs).

In September 2017, the Scottish Government announced plans to phase out new petrol and diesel cars and vans across Scotland by 2032, eight years ahead of the UK Government target. Making the announcement, Nicola Sturgeon also said there were plans to make the A9 Scotland's first fully electric-enabled road and that an innovation fund would be set up to encourage climate-change solutions such as charging vehicles in areas with a high concentration of tenements.

The Green Alliance is calling for a more ambitious deadline of 2030 which, it says, would boost sales of electrified cars in the UK and perhaps make the UK a net vehicle exporter. They are not alone in this view. In October 2018, MPs on the Parliamentary business committee called for the ban on new petrol and diesel vehicles to be brought forward to 2032, calling current government plans "vague and unambitious"

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Digital software platforms have changed everyday life for billions around the world. Platforms for higher education are now shaking up the way universities operate too. The “platform university” is being built on top of the campus, and its main motive is to profit from the HE market through the lucrative currency of student data.

A market in HE platforms is now expanding fast. The platform university is the result of multiple trends—demands for enhanced performance measurement; the opening up of HE to alternative providers; increased marketization, internationalisation, competition, and innovation; and the “unbundling” of HE into discrete services for outsourcing to platform providers, which then repackaged those services for sale back to the sector.

Platforms for matching students to degrees and graduates to jobs have become especially successful, and are prototypical of what the platform university portends. One of the most widely used, Studyportals, markets its service as an “International Study Choice Platform”. In 2018 alone it “helped 36 million students around the world to explore study programmes and make an informed choice, throughout over 190,000 courses at 3,200+ educational institutes across 110 countries”. Likewise, Debut uses data provided by student users to match graduates to employer internships and graduate schemes. The US platform Handshake also recently received US$40 million venture capital from an investment team that included Facebook founder Mark Zuckerberg. Its 2018 Campus to Career report details employment trends of over 9 million students who have used the platform—positioning itself as an authority on employability.

The global education business Pearson recently announced plans to offer on-demand services through a “global digital platform”. Bypassing the university to market “pay-to-view” education streaming services direct to the consumer, it plans to become the Netflix of education. Simultaneously, it is selling online learning platforms to universities to improve internationalisation performance.

By transforming HE to be more demand-driven and on-demand, platform companies are making the sector into a profitable market. Venture capital investment in HE platforms can be eye-watering. Potential implications for higher education in 2040

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The thesis in this article is that the HE sector could benefit from applying a strategic focus on students. It argues that students have a wide range of attitudes, motivations, behaviours, and expectations that can be organised around needs rather than characteristics and this can help universities to better understand young people’s experiences and struggles. The author conducted research on student background, university and career choices, health and emotional stability, social behaviours, leadership aspirations, confidence levels, engagement with their university, as well as questions to understand their work readiness, social conscience, and future plans and expectations. Injecting statistical rigour through factor and cluster analysis, the output was a segmentation of students into six groups:

Strategic segmentation could help universities to more confidently develop their service offerings and prioritise improvements, as in this illustrative example. The author argues the approach is even more valuable when universities can compare their own segment composition against the full student market and see where they have gaps. This can help to identify certain segments to target through tailored and more engaging messages, in turn, driving marketing effectiveness.

Segmentation can also help inform how to improve the student experience. With their rising expectations of personalisation and immediate gratification, young people want service offerings to adapt to them. But a strategic segmentation can still help deliver services that feel personalised without necessarily needing to treat each individual student differently.

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Cisco Systems published a white paper on the internet of things and its impact on education in 2013 which – given the slow time to move towards (even early) adoption remains relevant now. The paper makes the key point that universities will need to prepare students to work in a world in which IoT practice will be widespread.

Cisco identified ‘four pillars for the IoE in Education’. Adopting IoE into the learning environment as well as the services environment will require universities to address all four:

- **People** in 2030 will be hyper connected and the sector will need to track and understand these connections in order to monitor how much time they spend on course materials and in forums, to identify which experts and materials need to be brought into the learning programme at which points in time. Critically, this information will provide individualised feedback to teachers, helping them to improve course content, methodology, process of delivering courses, and best practice in achieving learning outcomes through technology.

- **Process** will connect people, data and things together. Connections will become increasingly relevant value creators, delivering the right information is delivered to the right person, at the right time, in the right way.

- **Data** will become more intelligent, providing higher-level information designed to support learning requirements. For example, researchers will be able to tag and collect data from physical objects and feed information to other programs for analysis, improving the accuracy of their research.

- **Things** - objects - will become context-aware due to the data sensors that will connect everything together. They will providing more experiential information to help people and machines make relevant and valuable decisions. This will have profound implications for research practice, access to and availability of data.

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A March 2016 article in EdTech considers how the Internet of Things (IoT) will reshape higher education. The article doesn’t touch teaching or research but focuses on how IoT will impact on professional services – or business delivery to put it another way.

It points out that IoT will enable institutions to begin deploying connected security equipment, such as cameras, access controls, locks and other monitoring devices. IoT-enabled classroom technologies will be upgraded and repaired remotely and timeously (and, of course, not necessarily from the same campus, city or even country in which the university is located). Facilities maintenance will benefit from the IoT’s monitoring and control capabilities, as higher ed institutions install technologies such as smart HVAC systems and water and energy meters that can not only streamline repairs but also lower resource consumption.

However universities decide to incorporate the technology, IoT is sure to rapidly alter business processes. For that reason, universities should consider proactively adjusting their change management programmes and providing training and professional development opportunities that will help staff evolve with the new technology.

Improvements to campus infrastructure will also be instrumental to IoT success. From the sensors involved in facilities maintenance to the smart TVs sitting in students’ dormitories, connected devices are producing vast amounts of data every day. That information will only expand as the technology matures and smart objects move from tracking raw data to reporting higher-level insights.

Universities can prepare for this influx of data by moving from on-premises storage solutions to the private or public cloud. Leaning on the expertise of technology partners can help IT decision-makers better identify options that will not only expand the institution’s storage capabilities but also lower its costs and promote mobility. And making the move early will create competitive advantage for universities that can exploit the full value of the IoT, once the technology comes to bear.

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The Economist reports on visiting Humanyze, a Palo Alto firm that provides “people analytics” to clients. Its employees mill around an office full of sunlight and computers, as well as beacons that track their location and interactions. Everyone is wearing an ID badge the size of a credit card and the depth of a book of matches. It contains a microphone that picks up whether they are talking to one another; Bluetooth and infrared sensors to monitor where they are; and an accelerometer to record when they move.

“Every aspect of business is becoming more data-driven. There’s no reason the people side of business shouldn’t be the same,” says Ben Waber, Humanyze’s boss. The company’s staff are treated much the same way as its clients. Data from their employees’ badges are integrated with information from their e-mail and calendars to form a full picture of how they spend their time at work. Clients get to see only team-level statistics, but Humanyze’s employees can look at their own data, which include metrics such as time spent with people of the same sex, activity levels and the ratio of time spent speaking versus listening.

Such insights can inform corporate strategy. For example, according to Mr Waber, firms might see that a management team is communicating only with a couple of departments and neglecting others; that certain parts of a building are underused, so the space should be redesigned; that teams are given the wrong incentives; or that diversity initiatives are not working.

Hitachi sells a similar product, which it has cheerily branded a “happiness meter”. Employee welfare is a particular challenge in Japan, which has a special word, karoshi, for death by overwork. Hitachi’s algorithms infer mood levels from physical movement and pinpoint business problems that might not have been noticed before, says Kazuo Yano, Hitachi’s chief scientist. For example, one manufacturing client found that when young employees spent more than an hour in a meeting, whole teams developed lower morale.

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Known successful cyber attacks on British universities have nearly doubled in two years, with criminals launching hundreds of successful cyberattacks targeting scientific, engineering and medical advances including research into missiles. Personal data - especially using non-anonymised records used for research - is also sought after for money laundering or identity theft. The University of Oxford identified 515 cases of unauthorised access to its accounts or machines in 2016/17 and UCL said it experienced 57 successful attacks in the same time period. Queen Mary, University of London, said that it had blocked 38.75 million attacks over the period.

Experts said that criminal gangs were finding ways through often weak defences in an attempt to steal sensitive information on behalf of foreign states or to sell it on to them. Carsten Maple, director of cybersecurity research at Warwick University said that cyberdefences at universities needed to be urgently tightened to prevent IP theft. One issue is that cybersecurity relies on good practice by - and education of - all staff and students.

The National Cyber Security Centre has called for organisations to ensure that online security is as robust as possible. “We can’t do this alone”, a spokesman said.

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