Department for the Economy
www.economy-ni.gov.uk

Economic Research Digest
Quarter 4 2017

The **Economic Research Digest** monitors recently published research across a number of economic areas relevant to the work of the Department for the Economy such as competitiveness, innovation, enterprise, trade, FDI, tourism and infrastructure. The Skills Research Digest deals separately with recently published skills and labour market research.

In each case, we provide a short summary of the key points and web links to the full article or report*. A full list of sources can be found at the end of the publication.

Highlights this quarter include:

- New government strategies published including the UK Industrial Strategy, Clean Growth Strategy, Scottish Energy Strategy and Welsh City Deals.
- Several reports on the impact of Brexit on industries, cost of living and trade.
- Major statistical releases covering economic growth, living standards and business performance.
- Research ranking the UK's prosperity internationally and exploring the Republic of Ireland's competitiveness challenges.
- Commentaries on the costs of decarbonising sectors and the digital economy along with the associated challenges therein.

** Links are correct at the time of publication, however it is likely that some will break over time. The list of sources has more general links, which should help the reader to track down the original report.*

Contents

The Economic Research Digest is issued by:
Analytical Services, Department for the Economy ✉ analyticalservices@economy-ni.gov.uk

Economic Outcomes

COMPETITIVENESS

Ireland's Competitiveness Challenge 2017 **published by the National Competitiveness Council (NCC) reports on key competitiveness issues facing the Irish economy and offers recommendations on policy actions required to enhance Ireland's competitive position. This report is split into two themes.**

- Theme 1: Ensuring growth is sustainable:
  - Appropriate fiscal and budgetary stance consistent with the EU budgetary framework should be adopted to ensure Ireland is best positioned to withstand shocks, and ensure that the economy does not overheat.
  - Ireland should continue to reduce debt levels to ensure debt is sustainable for future generations and to reduce revenue foregone on interest payments.
  - Ensure capacity to absorb and respond to economic shocks by avoiding any narrowing of the tax base.
  - Develop the infrastructure base, particularly the shortfall in housing, while complying with the EU's fiscal rules, as this is a fundamental challenge to enhancing competitiveness.
  - The education and training system must continue to provide people with the skills that businesses need and with the ability and opportunity to contribute, particularity in an increasingly digital world.
- Theme 2: Generating an uplift in enterprise competitiveness:
  - Outside of the Budget 2018, fiscal measures are needed to strengthen the competitiveness of Irish SMEs and it is vital that policy makers continue to monitor the landscape for enterprise finance so that viable businesses are not constrained by an inability to access finance.
  - Productivity levels and growth rates in Ireland are heavily influenced by the performance of the Manufacturing and ICT sectors and the performance of a small cohort of Foreign Direct Investment (FDI) enterprises within each. Bridging the productivity gap that exists between the most productive firms and laggard firms is a major challenge to sustainable growth prospects.
  - Supporting an increase at firm level in terms of investment and utilisation of knowledge based capital, particularly organisational, process and marketing innovation is crucial.
  - To remain globally competitive, Ireland requires continuous sufficient and effective investment in R&D not only by the State but especially by the private sector; the presence of high-quality scientific research institutions; extensive collaboration in research between universities and industry; and sophisticated business practices and effective clusters.
  - Requiring policies to facilitate enterprise to move into new products, markets and sectors, whilst maintaining the competitive advantages in existing ones, are now critical.

Smart Cities Strategy: A Global Review 2017 **published by Future Cities Catapult sets out some of the principles and patterns that are seen across smart city strategies.**

- In most cases, regardless of the cities' goals, smart cities are primarily associated with the deployment of ICT solutions and collecting and analysing data to improve decision-making.
- In the regions observed, smart city strategies are made through collaborative stakeholder engagement with city stakeholders and citizens. The merits of such a collaborative approach are well-understood – it creates a better suited strategy that has more buy-in with the stakeholders that need to deliver it. However such an approach takes longer to complete, and more resources.
- Cities that are writing a smart city strategy for the first time usually create a separate strategy to start with.
  - As strategies mature, there is evidence that they gradually become more embedded within the overall city vision, such as New York. This gives ownership of the smart city strategy to the service and budget owners that have the power to implement and scale.
- Smart city funding is still highly dependent on project financing, and is not often tied to core city funding. This reflects a failure to connect innovation and pilot schemes with large scale services and purchasing decisions. Where direct cost savings are available, e.g. smart lighting, support from core city funding may be easier to secure.

- Based on the results found cities embarking or already on smart city journey should:
  - Establish strong leadership to develop skills and capacity within local government to deliver at-scale smart city projects.
  - Embed the smart city strategy within existing statutory frameworks in order to ensure the strategy's implementation and funding.
  - When creating the smart city strategy, consider a collaborative approach, coupled with strong political support, to ensure to harness citizens' and businesses' capabilities and respond to their needs.
  - Tap into core city funding by regularly scanning the existing city assets and budgets in order to leverage these for smart city projects.
  - Carve pilot funding out of the city budget. Create a plan for private sector collaboration, as well as a designated person or team for communicating with businesses and investors.

PRODUCTIVITY AND GROWTH

Regional gross value added (balanced), UK: 1998 to 2016 **published by the Office for National Statistics (ONS) provides, for the first time, a "balanced estimate" of regional gross value added bringing together the income and production approaches to measuring the economy into a single estimate at a regional level.**

- In 2016, "real" GVA for the UK in chained volume measures, increased by 1.6%; the highest annual growth of Nomenclature of Units for Territorial Statistics (NUTS1) areas was in London at 3.0% and the lowest annual growth was in the North East at minus 1.0%. Northern Ireland had growth between 2015 and 2016 of 1.1%
- In 2016, in "nominal" current basic prices, all capital cities showed strong growth, with the highest increase in Cardiff at 5.7%, closely followed by London, at 5.1%; Edinburgh increased by 4.6% while the lowest growth was seen in Belfast at 2.3%.
- At the NUTS1 level, in 2016, London had the highest GVA per head, in current basic prices, at £46,482 while Wales had the lowest at £19,140, Northern Ireland was third lowest at £19,997 sitting above the North East (£19,218) and Wales.
- In terms of local areas, Belfast ranks in 10th spot with GVA per head of £35,791 and annual growth in GVA per head of 1.9%; Camden and London had the highest GVA per head and grew by 6.3%.

The Great British Breakthrough: Driving productivity growth in the UK **published by Centre for Social Justice (CSJ) seeks to define long term drivers of productivity stagnation under three headings: innovation, human capital and regional dynamics.**

- 42% of business leaders believe investing in new technology is the most important business activity for the future of their business, whilst financial support for R&D was the fourth most favoured Government policy designed to boost productivity.
  - With regard to innovation there should be increases in capital investment across the British economy; an increase in Government spending in R&D; simplification of the tax system to encourage capital investment; greater support for entrepreneurs, especially from disadvantaged backgrounds; and support for management to increase take up of new generation technologies.
- For human capital there has been no wage growth for the bottom 20% of the income scale and low levels of occupational progression for over two decades. It has been established that the education system is failing a majority of disadvantaged students.
  - To improve education and training change is needed i.e. rethink of Professional and Technical Education in the UK; diversification of routes through education and into employment; better support for the FE college sector; employers to better support professional training, better terms of employment and support for occupational healthcare schemes.
- In terms of regional dynamics the gap in productivity performance between London and the rest of the UK is growing. There is evidence that productivity growth has been largely exclusive, often occurring in areas with high density of poverty and social breakdown. Understanding productivity growth requires understanding the regional dynamics that have shaped the British economy.
  - Reducing the productivity gap will require building local competitive advantage across regional city based clusters; spending on physical and social infrastructure; attracting 'Big Employers' to a cluster; and pairing a local growth plan with a radical anti-poverty agenda, ensuring inclusive productivity growth.

From ostrich to magpie **published by CBI UK sets out to find new ways to tackle the striking variation in productivity that exists between UK firms. The results are clear: the UK needs more 'Magpie' and fewer 'Ostrich' businesses.**

- Low take-up of readily available technologies and management best practices is driving the UK's productivity problem. While the UK's best performing firms are highly innovative, best practice must reach a greater range of businesses, improving productivity through the adoption of technologies and ideas that are proven.
- The UK's performance on taking up digital technology lags European leaders. In 2015, the proportion of UK firms adopting cloud computing was nearly 30% below Europe's best performers. This underperformance has persisted over time.
- UK businesses underperform on the adoption of effective management and leadership styles relative to top performing countries. This is crucial to productivity, including through firms' ability to take up technology.
- The UK must protect and enhance parts of its business environment that already encourage adoption, such as integration with global value chains; labour market mobility; and external collaboration.
- The areas that must be addressed include where the UK environment disadvantages adoption relative to other countries, such as getting more firms exporting; embedding skills and processes; visionary management and leadership; securing capital for investment and allocating it effectively.
- Government and business must lead a long-term change in the UK's adoption of technology and management best practice:
  - Make innovation diffusion a central theme of the Industrial Strategy
  - Set up innovation diffusion pilots to test different types of on-the-ground support for businesses
  - Link future Local Enterprise Partnership (LEP) funding to improving adoption
  - Run a campaign on the 'Five technologies all companies could adopt'
  - Create a TripAdvisor-style e-platform for assessing technology and business support.

LIVING STANDARDS, WELLBEING AND PROSPERITY

The Legatum Prosperity Index 2017 **published by the Legatum Institute, evaluates long-term changes in global prosperity, pinpointing some of the drivers of progress and highlighting those nations that have made the greatest strides forward.**

- World prosperity increased in 2017 and now sits at its highest level in the last decade. It is now 2.6% higher than in 2007. Furthermore, prosperity growth has been faster from 2012 to 2017 than it was from 2007 to 2012.
  - Small advanced economies make up the majority of the 10 most prosperous countries: Norway (1st), New Zealand (2nd), Finland (3rd), Switzerland (4th), Sweden (5th), the Netherlands (6th), Denmark (7th), Canada (8th), Australia (9th) and the UK (10th). Elsewhere, the Republic of Ireland ranks 12th.
  - The UK has the best business environment in Western Europe (5th out of all countries) and also performs strongly on economic quality (7th), education (8th) and natural environment (9th). The greatest weaknesses for the UK relate to health (19th), personal freedom (18th) and safety & security (17th).
  - The Republic of Ireland performs most strongly on personal freedom (5th) and social capital (8th). However, its health (27th) and natural environment (27th) rankings are poorer and economic quality (19th) is also relatively low although this has improved faster than elsewhere within Western Europe.
- For the first time in the Index, Western European prosperity is higher than in North America, albeit marginally. Western European prosperity remained broadly constant; but North America fell faster than any other region, due to an increase in the number of homicides and greater societal pressure on citizens' freedom of religion.

Northern Ireland Multiple Deprivation Measures 2017 **published by Northern Ireland Statistics and Research Agency (NISRA) identifies the small area concentrations of multiple deprivation in Northern Ireland including income, health, employment, education, skills and training deprivation.**

- The Income Deprivation Domain identifies the proportion of the population living in households whose equivalised income is below 60% of the NI median:

- 24 are in Derry City & Strabane, accounting for 32% of its 75 Super Output Areas (SOAs); the highest proportion of all Local Government Districts (LGDs). None of the 72 SOAs in Antrim & Newtownabbey were among the 100 most deprived SOAs.
- 30 of the 100 most deprived SOAs are classified as Rural.
- Creggan, located in Newry, Mourne & Down, is the most deprived SOA according to the Income Deprivation Domain.
- 4 of the 10 most deprived SOAs are in Newry, Mourne & Down.

Living standards, poverty and inequality in the UK 2017-18 to 2021-22 **published by IFS attempts to fill the gap caused by household income data lag by estimating what has happened since 2015–16 to household incomes and poverty rates.**

- Real median income is projected to grow by around 5.1% between 2015/16 and 2021/22. However, this projection is highly sensitive to the path of real earnings, and might well turn out to be optimistic given that the Office for Budget Responsibility (OBR) have indicated they are likely to revise down their forecast for future earnings growth.
- Inequality is projected to rise between 2015/16 and 2021/22, as working age benefits are cut and real earnings growth boosts the income of higher income households.
- At the UK level, absolute poverty – defined using a fixed real poverty line, and after deducting housing costs – is projected to remain roughly unchanged between 2015/16 and 2021/22.
  - Absolute child poverty is projected to rise by 4.1% primarily due to the impact of planned changes to working-age benefits.
  - Absolute poverty is projected to fall in the South, the East, Yorkshire and Scotland, but rise in the North East, North West, Wales, Northern Ireland and the Midlands.
- Different trends in poverty are partly driven by share of income that low income families get from earnings. Those regions where low-income families are less reliant upon earnings (and more reliant upon benefits) are projected to see a larger increase in absolute poverty.

Consuming Forces: Generational living standards measured through household consumption **published by Resolution Foundation (RF) looks at people's consumptions and determines the standard of living in the UK.**

- A particularly prominent shift over the past 25 years has been the growing role of housing in working-age household expenditure. Rent and mortgages made up 12% of spending for 25-64 year old adults in 1989, rising to 17% by 2014.
- The proportion of all spending allocated to food, clothing and domestic fuel declined from almost half (47%) of total non-housing spending in 1963 to just over one-fifth (22%) in 2014. In this period spending has instead shifted towards leisure, communications and transport.
- The consumption of housing (that is, the amount spent on housing on average after accounting for changes in its cost) increased by £8 per week for both 25-34 and 40-49 year olds between 2000-01 and 2014, and by £5 for 55-64 year olds.
- Rather than providing a comprehensive account of how lifestyle changes have combined with prices and incomes to determine changes in living standards across all areas of consumption expenditure, the analysis takes a selective look within five spending categories:
  - Eating in and eating out. Eating out expenditure was 25% higher among 25-34 year olds than among 55-64 year olds, mainly accounted for by the fact the younger group spent less eating in.
  - In terms of transport, young adults spent relatively less on private transport (mainly cars) than other age groups did in 2014 and more on public transport and flights. The overall pattern appears to be driven by the spending of those with higher incomes in each age group.
  - Turning to communications, young adults today spend more on modern communications technologies than older ones: 25-34 year olds spent 32% more on mobile phones and internet services than 55-64 year olds in 2014. Strikingly, young adults now spend more on mobile phones than they do on alcohol and tobacco combined (£7 per week compared to £6).
  - Leisure goods and services are a larger category of expenditure for older working-age adults than for younger adults. Big decreases in the price of electronic and technology-related leisure goods partially explains the fact that consumption of these items has risen in volume terms in the past 14 years, for 55-64 year olds in particular.

- The biggest age gradient is in the changing consumption of holidays: older working-age adults consume most and have experienced the strongest growth between 2000-01 and 2014. The report has found that millennials are jet setting more than predecessors.

Changing Lanes : The impact of different post-Brexit trading policies on the cost of living **published by RF examines what impact two 'no deal' Brexit scenarios - reverting to most-favoured-nation (MFN) tariffs, and eliminating all tariffs - could have on prices and living standards in the UK.**

- The impact of reverting to MFN tariffs with the EU, in which the UK raises its tariff on EU goods to the level that the UK is obliged to levy on goods from other countries, are:
  - Food products are likely to see a more dramatic increase in tariffs compared to manufacturing and other non-food items. In some case, such as meat and dairy products, tariffs will rise by over 30%.
  - The largest price effect is for dairy products (8.1%), which is the result of such products having the largest average tariff increase and a large share (98%) of UK imports coming from the EU.
  - Across all food and goods reverting to MFN tariffs with the EU is expected to raise prices by 2.7% on average.
- The second scenario looks at the impact if the UK reduced its tariffs on other countries to the current level that it applies to EU goods which is 0%. If tariffs were set to zero, households in the bottom 10% of the distribution would benefit the most (as a share of their total consumption prices would fall by 0.7%).
  - Across the top half of the income distribution prices fall, on average, by 0.5%, while across the bottom half of the income distribution the figure is also 0.5%.
  - Although the effect is in the opposite direction we can compare this to the impact of reverting to MFN tariffs with the EU. In this scenario prices rise by 0.8% on average for households in the top half of the income distribution but by 1% for households in the bottom half.
- Reverting back to MFN tariffs the study has found 42% of households experience price rises of between £25 and £150 and a further 27% experience price rises between £180 and £290. However, there is a sizeable minority of around 3.2 million households who experience price rises of £500 or more.
- The spending profile of households in Northern Ireland are similar to those in the rest of the UK (although energy prices are higher) but because total consumption is lower in Northern Ireland rising goods prices have a proportionally larger impact. i.e. the impact on households on average in Northern Ireland will also be a third greater than for those in London.

Why the cost of living is so high **published by TaxPayers Alliance.**

- In the financial year ending 2016 total average household expenditure remained level at £528.90 per week when compared with the same period the year before, where figures are adjusted for inflation.
  - By regions, Northern Ireland (NI) average weekly household spending is £500 whereas London had the highest average household expenditure at £652.40. The North East had the lowest average weekly spending by region at £423.50 more than £200 lower compared to London and £76.50 lower than NI. The main contributor to this disparity is the cost of housing.
- Transport is expensive in the UK due to fuel duty and government intervention in the railways.
  - Transport and housing were the highest expenditure categories for the majority of UK regions. The exceptions to this were the North East, the North West, and Yorkshire and the Humber; households in these regions spent the most amount of money on recreation and culture.
- VAT increases the price of goods significantly which results in further pressure being placed on household budgets.
  - Spending on food and non-alcoholic beverages has fallen from approximately 40% of total household spending to approximately 11%.
  - In the financial year ending 2016, households with the lowest incomes spent 17.3% of total expenditure on food and non-alcoholic drinks. In comparison, households with the highest incomes spent 7.5% of total expenditure on this category.
- Increases to the minimum wage have led to higher prices for consumers in restaurants and hotels and decreased the employment opportunities of low skilled workers.
- The common agricultural policy (CAP) has the impact of increasing food prices for consumers in three ways.

- Firstly through tariffs on products which are imported into the European Union. Agriculture tariffs under the CAP are more than three times higher than the average EU tariff and stand at 8.5%.
- Secondly, taxpayers are subsidising EU farmers. Not only are these subsidies a burden on taxpayers, they also increase food prices for consumers.
- Finally, there are regulations relating to food standards. Under the CAP, food which has been treated in various ways and which comply with the health and safety standards of countries outside of the EU and EEA are not allowed to be sold within the UK. An example of this is chlorine washed chicken.

The Centre for Economic Performance (CEP) published *The Brexit Vote, Inflation and UK Living Standards* focusing on how the referendum vote has affected living standards in the UK.

- CEP baseline estimates imply that the vote led to a 1.7% increase in inflation in the year following the referendum. This means that by June 2017, the Brexit vote was costing the average household £7.74 per week, or £404 per year, through higher prices.
- No evidence was found that the Brexit vote has affected nominal wage growth meaning the increase in inflation has also led to lower real wage growth. The estimates show that higher inflation due to the referendum has cost the average worker close to one week's wages.
- The costs are quite evenly shared across the income distribution, but not across regions. The least affected region is London where the rise in inflation due to the referendum is 0.35% below the UK average.
  - By contrast, Scotland, Wales and Northern Ireland are worst affected. Compared with the UK average, the increase in inflation due to the vote is 0.18% higher in Scotland, 0.21% higher in Wales and 0.47% higher in Northern Ireland.
- Annual CPI inflation increased from 0.4% in June 2016 to 3.0% in September 2017. Other major economies also experienced an increase in inflation over this period, but the rise was much smaller. In the Euro Area, inflation increased from 0.1% in June 2016 to 1.5% in September 2017, while US inflation rose from 0.2% to 1.9%.
- A lower exchange rate raises the cost of importing both consumption goods and intermediate inputs. Consequently, it is natural to hypothesise that the Brexit vote and subsequent exchange rate depreciation caused the rise in inflation in the UK.
- Higher inflation may also be driven by other trends in the UK economy or by global economic events that are unrelated to Brexit, such as changes in the price of oil and inflationary pressures resulting from faster growth in the euro area and the United States.

Will Brexit raise the cost of living?* published by National Institute of Economic and Social Research (NIESR) considers two aspects of this question, first, the impact of the devaluation of the sterling and second, the possibility of a MFN Brexit. *This article requires a subscription to access.

- Annual food and drink inflation, which, based on import intensity, is relatively sensitive to changes in the value of sterling, it rose by between 6% and 5% in both periods.
  - Households headed by an unemployed person spend a significantly larger share of their total spending on food and drink (20%), as do pensioner households (17%), compared to those headed by someone in full-time work (12%) and are thus more seriously affected when the price of food and drink rises.
- There are two factors that determine how a household is affected by an increase in tariffs. The first is the price changes which range from around 8% for 'dairy products' to around 0.4% for 'fuel and energy'. The second is the consumption pattern of the household.
- Spending on clothing is expected to rise by 2.2% for a single person household, below the average rise of 2.6%. However, spending on clothing for households headed by an unemployed person is expected to rise by 2.9%.
- Thirty per cent of households experience spending increases similar to those experienced by the groups above of between 0.8% and 1.1%.
  - For the majority of households (71%) spending increases by between 0.5% and 1.5%.
  - Within this group there will be many higher income families for whom such an increase has little impact on their living standards. Yet there will also be many for which an increase of between 2% and 4.7% represents a significant chunk of their weekly expenditure.

- Based on the real (2016/17 prices) median level of total weekly consumption expenditure in the UK in 2016/17, a 2% to 4.7% rise would equate to an increase in the cost of living of £400 to £930, which, if incomes were held constant, would translate into a loss of real income of these magnitudes.

Sustainable cities mobility index 2017: bold moves **published by Arcadis combines individual metrics and sub-indices into an overall Index score giving an indicative picture of the current state of a city's urban mobility environment.**

- Hong Kong takes the top spot in the overall Index. The Asian city also tops the People sub-index, boosted by its innovative and well-connected metro network and a high share of trips taken by public transport. It takes sixth place in the Profit sub-index.
- The data highlights that the wealth, size or age of a city does not necessarily equal sustainable urban mobility. It is clearly demonstrated as the comparisons between wealthy cities like Hong Kong (1st) with Los Angeles (72nd); massive urban centers like London (7th) with Jakarta (89th); and some of the earliest developed cities like Paris (3rd) with Cairo (94th).
- Cities that have pursued bold moves of innovation and planned for future growth see the greatest sustainability and quality of life benefits. Sustainable systems depend on the decisions of city leaders and disruptive technologies mean there are more opportunities than ever to create cities that are built to move us into the future.

Innovation and Enterprise

INNOVATION

Digital innovation: The route to the highways systems of the future **published by ADEPT, provides a framework that can accelerate local innovation consistently and robustly.**

- Digital innovation has the potential to be a game changer, improving highways assets, and network management and user experience.
- There is a real risk that local systems – responsible for 96% of the highways network – will either be left behind or deliver the benefits of digital innovation slowly and by piecemeal.
- Technologies to drive this transition already exist, and some are already deployed in increasingly 'smart motorways' and through the availability of real-time user information. Government's recent plans and strategies want these rolled out on both the Strategic Road Network (SRN) and the impending Major Road Network (MRN) from 2019.
- There are three potential initiatives to accelerate bringing the framework to life:
  - To address the blockages of knowledge transfer it suggests the establishment of a specialist Knowledge Exchange Capability.
  - To reduce capacity and capability deficit it suggests that the knowledge hub sponsors production of a series of good practice / 'how to' guides and toolkits on key topics where there is evidenced local authorities demand.
  - To address the currently limited examples of innovation at scale, two suggestions are put forward one focused on new development and one on retrofit.

Innovation in firms and labour market outcomes **published by the Economic and Social Research Institute (ESRI).**

- The analysis shows that innovators are likely to have higher labour productivity than enterprises that are not engaged in innovation. In particular, labour productivity of firms introducing product innovation is on average around 174% higher than the productivity of firms without product innovation.
  - The analysis also shows that firms that implement marketing innovation are likely to be more productive by a factor of 136%.
- Employment growth is higher among innovative firms compared with non-innovators in all sectors, with one exception, knowledge-intensive services, where the rates are quite similar (and positive). Therefore innovative firms tend to create more jobs than non-innovators.
- While employment growth is particularly strong in low-knowledge-intensive services, regardless of innovation status, there is a large contraction in employment among non-innovative firms in low-

technology manufacturing. This could imply that many low-skilled workers have lost their jobs in these country groupings and may have to change sectors to find employment.

RESEARCH AND DEVELOPMENT

Northern Ireland Research & Development 2016 Headline Results **published by NISRA provides indicators of the extent to which Northern Ireland companies and higher education establishments are investing in the activities that underlie future economic development.**

- In 2016, £739.3m was spent on Research & Development (R&D) by Businesses, Higher Education and Government in Northern Ireland (NI). This is a decrease of £9.4m (1.3%) in cash terms compared to the previous year.
- Of the £739.3m spent on total R&D, £523.8m (70.9%) was spent by Businesses, £193.8m (26.2%) by the Higher Education sector and the remainder (£21.7m or 2.9%) was Government expenditure.
- R&D expenditure by Small and Medium-sized companies (SMEs) increased by 2.9% (£7.4m) from 2015 to 2016. In cash terms, since 2011 SME expenditure has increased by 85.3% (£120.0m) from £140.6m to £260.6m.
- 17% of businesses that engage in R&D expenditure were externally owned (128 businesses). These companies accounted for 59.8% (or £313.2m) of Business R&D expenditure in 2016. The expenditure of such externally owned businesses decreased by 10% (£34.9m) over the year, from £348.1m in 2015 to £313.2m in 2016.
- Of the twelve UK regions, eight showed an increase in in-house business R&D expenditure in cash terms over the year to 2016. Northern Ireland decreased by 4.0%, which was the largest percentage decrease across all the UK regions

SECTORS AND TECHNOLOGIES

The Future of Global Manufacturing **published by CBRE, examines where the main locations for global manufacturing will be by the year 2025 and what this will mean for industrial and logistics real estate.** ***This article requires a subscription to access.***

- Manufactured goods worth $12.8 trillion flowed through parts of Asia, the Americas and Europe in 2017, and by 2025 that total is expected to reach $14.8 trillion, equivalent to 15% of global GDP.
- Demand for industrial and logistics real estate from both occupiers and investors has been rising since the global financial crisis of 2008.
  - Global average prime yield for industrial real estate has fallen to 5.3% from 8% due to the rise in e-commerce. This also reflects the rise of Asia Pacific as the world centre of manufacturing activity and increased investment in infrastructure that transports new and expanded flows of goods to the marketplace.
- Manufacturing is important for the global economy as it employs 550 million people in total. As a percentage of GDP, manufacturing in the advanced economies ranges from 23% in Germany to 10% in the UK.
- Falling trade barriers, reduction of shipping costs and easier global communication have allowed global companies to make substantial cost reductions by outsourcing non-core activities to other companies or off-shoring production to lower cost locations or both.
  - At a macro level the impact of the development of global supply chains has caused an increase in world trade more rapidly than world GDP in the 25 years between 1985 and 2010.
- It has been suggested that supply chains in some industries are beginning to compress to better meet the demands of increasingly impatient consumers by bringing production and inventory closer to the end user. Consider the automotive sector, customers expect the ability to order and quickly receive a car with options tailored to their specific needs.
- World manufacturing activity is expected to grow by 2.7% in real terms over the next 8 years reaching a value of nearly $18 trillion. The cause of this expectation is the rise in consumption particularly in emerging markets such as China.

Appetite for Global Success **published by ResPublica looks at the importance and strength of the Food and Drink (F&D) manufacturing sector and its role in the entire food chain, with the contribution to jobs, exports and economic footprint across the UK.**

- Food production is now a global multibillion dollar industry worth $8 trillion and projected to increase with rapid population growth. By 2050, the world's population is expected to pass nine billion, requiring a 60% increase in food production output.
- Putting F&D manufacturing at the heart of the Industrial Strategy, with a goal of establishing the UK as a global leader in healthier, sustainable food offers a pathway to a secure future, important not just for the industry but for the UK's economic performance.
  - The success of implementing an F&D manufacturing strategy has been seen in Scotland. A decade after the strategy commenced, turnover has increased 44% and exports have grown 56% to £5.5bn.
- F&D manufacturing GVA grew by over 26% from 2000 to 2015, nearly double the rate of all manufacturing.
  - F&D manufacturing is also linked to three other food sectors, F&D wholesaling, F&D retailing, and F&D catering and food services. Between them these four sectors contribute £101 billion to the UK economy.
- The UK is 52% self-sufficient in food production and the EU accounts for one third of food imports.
  - The UK produces around of 52% of its food domestically and relies on around 20 countries for 90% of all imported food with the EU accounting for 29%.
  - The EU is also the UK's largest export market and bought, by value, just over 71% of UK food and non-alcoholic drink exports last year.
  - The category 'beverages', including soft drinks and mineral waters, is the largest single F&D manufacturing sector by GVA contributing 23% (£6.6 billion) to F&D manufacturing GVA.
- UK consumers spent a total of £203 billion on food and drink in 2016 – 43% on catering including restaurants and cafés and 57% on household food expenditure. On average, food equates to around 11% of all household expenditure, although this varies considerably depending on income.
- The F&D sector is hugely affected by the implications of Brexit, from the impact and uncertainty on exports and supply chains, to workforces and standards.

Brexit and the sectors of the Scottish economy **published by Fraser of Allander Institute.**

- Most independent analysis has concluded that Brexit will weaken the UK's (and Scotland's) growth prospects in the long-run. But the implications could look quite different for particular sectors and companies and much will depend upon how policymakers respond.
- In 2015, Scotland exported £12.3 billion of goods and services to the EU – equivalent to over 40% of Scottish international exports – more than exports to North America, Asia, South America and the Middle East combined. But the data shows that many other parts of the UK appear relatively more open to EU trade.
- Goods make up the bulk of Scottish trade with the EU. In 2015, just over 60% of Scottish trade with the EU was from manufacturing.
- Nearly 6% of total employment in Scotland (excluding public sector administration and defence) was supported by demand currently driven by exports to the EU.
- The full impact on Scottish industries and individual companies will depend upon a number of factors – not just exposure to EU markets – but also the type of tariff and non-tariff barriers that may exist post-Brexit. The importance of EU migrants as a source of skilled labour may also be significant for some individual firms and sectors.

Made Smarter: Review 2017 **published by HM Government summarises the findings and recommendations of the Made Smarter Review announced in the Industrial Strategy Green Paper in January 2017.**

- The positive impact of faster innovation and adoption of Industrial Digital Technologies (IDTs) could be as much as £455 billion for UK manufacturing over the next decade, increasing manufacturing sector growth between 1.5% and 3% per annum.
- Emerging technology breakthroughs in fields such as AI, robotics, and the Internet of Things are significant in their own right. However, it is the convergence of these IDTs that really turbo-charges their impact.
  - IDTs promises many things like the recapturing of UK's industrial spirit as a nation of 'creators and makers', raising UK productivity and international competitiveness; creating new, higher-paid, higher-skilled jobs that add value to society and positively offset the displacement of poor

productivity and poorly paid jobs; and improving the resource efficiency of the UK's industrial base.

- It is clear that the faster adoption of technology will result in greater investment and in more manufacturing taking place in the UK. For example, the automation of manufacturing processes, coupled with real-time process monitoring and re-engineering, can result in radical improvements in cost efficiency and accuracy, allowing work to move back to the UK from low-wage economies and strengthening UK supply chains.
- These technologies will deliver multiplier effects, creating new businesses and jobs throughout the UK economy including:
  - The potential for new industries and services to be created by harnessing the data and insights flowing from digital technologies, including real-time management of assets such as trains, jet engines or wind turbines;
  - The opportunity for the UK to be a leader in the development of digital technologies themselves, in areas of strength such as artificial intelligence, blockchain and virtual reality;
  - The need for support for this new economy from new and improved services and infrastructure in areas like cybersecurity, fibre networks, 5G, and remote monitoring.
- Three themes have been identified which are limiting the UK's ability to achieve its potential: lack of effective leadership of industrial digitalisation in the UK; poor levels of adoption, particularly among SMEs; and under-leveraged innovation assets to support start-ups/scale-ups

OECD Digital Economy Outlook 2017 **published by the OECD, examines the emerging opportunities and challenges in the digital economy and how OECD countries and partner countries are using the digital economy to meet their public policy objectives.** ***This article requires a subscription to access.***

- Information technology services continue to grow and spur a positive outlook. The information and communication technology sector remains a key driver of innovation, accounting for the largest share of OECD business expenditure on research and development and over one third of total patent applications worldwide.
- There has been growth in communication markets, which is driven by demand, and in many countries, by adapted regulatory frameworks that spur competition, innovation and investment. Telecommunication investment as a share of revenue has increased as operators further deploy fibre optics into their networks.
- Digital innovation and new business models are driving transformation, including of jobs and trade. Policies to support digital innovation tend to focus on innovation networks, access to finance and data (re)-use.
- The promises of Artificial Intelligence (AI) are accompanied by important policy and ethical questions. While there are promising gains in efficiency and productivity, there are also the potential effects on the future of work and skills development.

Digital China: Powering the economy to global competitiveness **published by McKinsey and Company assesses the strengths of China's digital system and the degree of digitisation of industries.**

- In e-commerce, China accounted for less than 1% of the value of worldwide transactions only about a decade ago; that share is now more than 40%. The current value of China's e-commerce transactions is estimated to be larger than in France, Germany, Japan, the United Kingdom, and the United States combined.
- Mobile payments among China's internet users grew from just 25% in 2013 to 68% in 2016. In 2016, the value of mobile payments related to individuals' consumption was $790 billion, 11 times that of the United States.
- China's venture capital industry is increasingly focused on digital. Overall, China's venture capital sector has grown rapidly, from just $12 billion, or 6% of the global total, in 2011–13 to $77 billion, or 19% the worldwide total, in 2014–16.
- The impact of digital China on the global economy has been increasing. China ran an annual surplus in digital services of $10 billion to $15 billion over the past five years. Its outbound venture capital totalled $38 billion in 2014–16, or 14% of global venture capital investment outside China, up from $6 billion, or 4%, in 2011–13.

ENTREPRENEURSHIP

GEM UK: Northern Ireland Report 2016 **published by The Global Entrepreneurship Monitor (GEM) is an international project, involving 65 economies in 2016, which seeks to provide information on the entrepreneurial landscape.**

- Northern Ireland has historically lagged behind the rest of the UK in terms of enterprise start-up activity.
- The rate of total early-stage entrepreneurship (TEA) in Northern Ireland in 2016 is 6.3%, relatively unchanged from 2015. This compares to 8.8% in the UK overall, 9.2% in England, 7.6% in Wales, and 7.3% in Scotland.
- Entrepreneurial activity is driven by opportunity motives; necessity-driven TEA in Northern Ireland is 1.0% in 2016 while opportunity-driven TEA is 5.1%.
- TEA rates tend to vary by age with those aged over 30 generally more likely to be engaged in entrepreneurial activity. In 2016, however, the TEA rate of young adults aged 18 to 29 in Northern Ireland was 8.4% (UK 8.7%), not significantly different to the TEA rate of 5.7% for 30 to 64 year olds (UK 8.9%).
- Within Northern Ireland the highest TEA rates are typically found in the Mid-Ulster Council area (66%) while Derry City and Strabane have the lowest (4.2%). The rate in Mid-Ulster is driven by male entrepreneurial activity, in fact over 2014-16 the male TEA rate in Mid-Ulster is more than double that of the male rate in Derry City and Strabane.

The OECD published *The Missing Entrepreneurs 2017: Policies for Inclusive Entrepreneurship* examining how public policy at national, regional and local levels can support job creation, economic growth and social inclusion by overcoming obstacles to business start-ups and self-employment by people from disadvantaged groups in entrepreneurship.

- Entrepreneurs from under-represented and disadvantaged groups are significant in number.
  - 30.6 million self-employed people in the EU in 2016, nearly 10 million were women, 763,300 were young people, 11.8 million were seniors, 635,000 had been unemployed in 2015 and 3.4 million were immigrants.
  - Although there are significant numbers of entrepreneurs among these groups, they are under-represented relative to their share in employment, suggesting unrealised entrepreneurial potential.
  - Women are half as likely as men to be self-employed and are less likely than men to report that they have the skills and knowledge to start a business.
  - 34.1% vs. 49.9% for men in the European Union between 2012 and 2016, and 36.8% vs. 51.2% for men in OECD countries would report that they have the skills and knowledge to start a business.
  - Only 4.1% of working youth were self-employed; young people also lack skills and experience in the labour market.
- Many of the businesses operated by under-represented groups are small, have low levels of turnover and lower survival rates than those started by the mainstream population.
  - Public policy should seek to support those with innovative ideas since they have the greatest likelihood of growing and creating jobs for others.
  - Entrepreneurship policy instruments (e.g. entrepreneurship training, coaching and mentoring, and finance) should be offered with progressive intensity for those who can demonstrate success.
- Policymakers are also increasingly concerned with new forms of work and self-employment, notably work organised through online platforms and mobile applications; some of these arrangements are precarious and can be of low quality and offer 'false' self-employment.

Mode of entry into hybrid entrepreneurship: new venture start-up versus business takeover **published by Institute of Labor Economics (IZA) investigates the determinants of hybrid entrepreneurs' entry mode decisions, distinguishing between business takeover and new venture start up.**

- Entrepreneurship entry modes can be classified not only into hybrid or full-time entrepreneurship but also into modes of starting a new venture or taking over an established firm. Because entrepreneurship is a risky career choice, risk-averse individuals are more likely to enter into entrepreneurship via a hybrid status.

- Entrepreneurs in urban areas are more likely to start a new venture rather than take over an existing firm. Characterised by dynamic economic sectors, mature business markets, and advanced technology, urban regions have a greater capacity to nurture creative projects.
- Policy makers will come across some implications in terms of business transfer and new venture creation policy. As business takeovers and new venture start-ups attract individuals with distinct characteristics and backgrounds, they should be treated as two distinct entrepreneurship entry modes.
- Both former CEOs (31% vs. 21%) and workers (13% vs. 7%) favour business takeover as an entry mode, whereas senior managers or liberal professionals prefer new venture start-up (20% vs. 6%).
- On average, hybrid entrepreneurs who choose new venture start-up possess higher educational attainment (for example, those with more than an A-level diploma is 45% vs. 18%) and are more likely to be French (91% vs. 86%).
    - In contrast, senior hybrid entrepreneurs 50 years or older are more likely to choose business takeover (22% vs. 18%). With respect to hybrid entrepreneurs' motivation, results show that hybrid entrepreneurs who choose business takeover show a stronger growth ambition than those who choose new venture start-up (69% vs. 55%).
    - The comparison of the firms' financial structure shows that business takeovers are characterized by higher start-up capital (for example, start-up capital > 80k € is 27% vs. 9%) and a lower percentage of self-funding (37% vs. 62%).

BUSINESS GROWTH

Northern Ireland Business Register and Employment Survey 2016 **published by NISRA, collects information on the number of male and females in full time and part time employment by business activity and by District Council Area.**

- The total number of employee jobs in Northern Ireland in September 2016 was 739,615, consisting of 82% in the Services industry, 11% in the Manufacturing industry, 4% in the Construction industry and 3% in the 'Other' industry.
- There was a larger increase in full-time jobs (7,257) than part-time jobs (3,425). However at 1.5% and 1.3% respectively the rate of increase was similar.
- Seven district councils recorded an increase in the number of employee jobs since 2015, excluding agriculture, the largest increase was in Antrim and Newtownabbey (4,251 jobs or 8%) to 60,188 jobs.
- The proportion of jobs in the public sector was 27% in 2016. This is the lowest proportion reported since public/private employee jobs figures were first published in 1997 when the proportion of public sector jobs was 34%.
- Between September 2015 and September 2016, there was a 2% decrease in jobs in the public sector (-4,803 jobs) and a 3% rise in jobs in the private sector (15,485 jobs).

Northern Ireland Annual Business Inquiry **published by NISRA, measures the size, performance and structure of the Northern Ireland non-financial business economy. This survey covers businesses in the production, construction, distribution and service industries.**

- In 2016, the income generated by businesses in Northern Ireland (NI), less the cost of goods and services used to create this income, was estimated to be £21.5 billion.
- The key contributor to approximate Gross Value Added (aGVA) growth was the production sector which increased by 6.8% (£413 million) between 2015 and 2016. The majority of aGVA growth in the production sector is attributable to the manufacturing section and energy generation and supply section.
- The NI non-financial services sector recorded aGVA growth of 3.8% (£289 million) while retail and wholesale trade (distribution sector) grew by 0.8% (£40 million).
- Turnover in the NI non-financial business economy as a whole increased by 2.7% (£1.8 billion) over the year and purchases of goods, materials, energy, water and services increased by 1.9% (£833 million). Employment increased by an estimated 1.3% between 2015 and 2016.

Fast-growth firms in the UK: definitions and policy implications **published by Enterprise Research Centre (ERC), aims to establish an evidence-based understanding about how fast growth firm definitions differ and what they mean to policy.**

- OECD-High Growth Firms (HGFs) constitute 1.2% of larger surviving firms and HGFs 1.7% of smaller surviving firms. Therefore, the two definitions of fast employment growth lead to a reasonably similar estimate of fast growth incidences among bigger firms and micro firms.
  - In contrast with the gap between the top 10% performers among larger firms (1%) and microenterprises (18%) in the employment growth distribution. It means that on average, smallest firms are over-represented among top employment growth firms in a given 3-year period.
- The top 10% of firms in terms of labour productivity growth represent 13.5% of all employment. On average, they experience negative net job creation in any given three-year period, suggesting that for these firms the growth in productivity is being driven by shedding jobs rather than increasing turnover.
- Growth Heroes (GHs) account for 17% of all jobs in surviving firms, which is more than double their contribution to the economy in terms of the number of firms. Growth Super Heroes' (GSHs) contribution of total numbers of jobs is on par with the OECD-HGFs, but the net job creation by these productive firms is less important.
- The top 10% of firms in terms of turnover growth contribute about the same as their numbers in the economy, represent 10% of employment in the economy and generate a moderate amount of net jobs.
- On average, all fast-growth firms contribute less than one tenth of the total UK turnover amongst all surviving firms in a three-year period, with GHs being an exception, contributing about 14% of total UK turnover.

An Entrepreneurial North: Helping Small Business and Entrepreneurship to Thrive in the North of England **published by FSB outlines how to ensure that the Northern Powerhouse (NPH) – and the Industrial Strategy – can most effectively help entrepreneurs and small business flourish across the north.**

- There are a number of hallmarks of successful actions and activity that can create a flourishing small business climate in the north. This includes:
  - Strengthen NPH small business support and offer pan-regional and local services. The survey data shows that Local Economic Partnerships (LEP) and Growth Hubs are way down the list of sources of support that northern small businesses turn to. Many small businesses are not aware of the LEP existence therefore a better system will need to be set up so that support is highly visible and easily accessible.
  - Increase investment in transport by improving transport connectivity will be vital to deliver growth in the north. A number of schemes have been identified which could help deliver this growth and build on the initial work of Transport for the North.
- Many small businesses have the potential to export but lack the time or resources to become engaged in international activity. Previous research has shown that, in addition to the 21% of businesses which currently export, an additional 21% of small businesses would consider exporting in future, with the right incentives and support.
- Adjusting for population size, LEP funding per capita ranges from £35 – £97 (Cumbria and Humber) to £177 – £213 (Leeds, Sheffield and Manchester), which, again, suggests that there are substantial disparities in funding across northern LEPs, and that underfunding is likely to be an issue for some more than for others.
- Improving digital infrastructure was viewed as the most important area for development for businesses across the north of England. The advantage of high-speed broadband is that it is beneficial for businesses of every sector, size, and physical location and whether they are in an urban or rural setting.
- Air passenger duty also needs to be reduced to make northern, and especially north-eastern, airports more attractive to inward investors as they currently carry higher costs compared to those in Scotland.

The State of Small Business: Putting UK entrepreneurs on the map **published by Nesta breaks down the SME landscape, looking at factors such as productivity, rates of growth, and business churn to provide a view of how small business is faring in our towns, cities, and rural areas across the UK.**

- Small businesses will be critical to the UK's ability to turn growth into larger pay packets and a better standard of living. Over 99% of businesses are SMEs, accounting for 60% of private sector employment, and 47% of turnover.
- Since 2010, SMEs have created 73% of new private sector jobs, despite accounting for just 60% of private sector employment. Of these 2.8 million new jobs, 34% came from non-employers, and 40% from SME employers. 27% came from large businesses.
- Northern Ireland has seen the lowest rate of SME growth in the UK at just 4%. While numbers are now recovering, the number of micro and small business employers in Northern Ireland are still lower than they were in 2010. However, Northern Ireland have seen the largest productivity gain, out of all the UK regions, of 13% since 2007.
    - At the centre of Northern Ireland's SME landscape is exporting, with 29% exporting compared to 18% across the UK. This trade is disproportionately dependent on the EU, with 53% of exporting SMEs in Northern Ireland exporting only to the EU, compared to 27% across the UK. The potential impact of Brexit may thus be felt more acutely by Northern Irish SMEs than in any other part of the UK.

Study on investment needs and obstacles along industrial value chains **published by The Economic and Social Research Institute (ESRI) aims to identify specific investment needs, financing gaps and obstacles to investment along a number of different industrial value chains.**

- Industries identified with the highest growth potential at the aggregate EU-level are:
    - Machinery and equipment value chain. Co-ordinated investment opportunities include further promotion of R&D, cost reductions for metal powder production and strengthening the link between the use of high end metals and the development of new applications;
    - Rubber and plastic products. In order to reduce Europe's dependence on imported natural rubber it is necessary to establish home production of rubber and increase efficiency of the use of rubber production of tyres. For this sector investment opportunities include joint investment programmes for the establishment of a home production base of natural rubber and networks for shared R&D projects;
    - Food, beverages and tobacco products. Investment opportunities includes the likes of joint R&D investment programmes. Co-ordinated investment opportunities include but are not limited to lack of size and resources and higher investment priorities in relation to other company areas;
    - Motor vehicles, trailers and semi-trailers. Investment in this sector is needed to develop new enhanced techniques for the reuse and recycling for batteries for electric vehicles. Investment opportunities include targeting cost reductions for cell production, pack assembly and recycling; and
    - Fabricated metal products value chain. The identified investment need is related to the challenges regarding sustainable production, including the need for increasing material efficiency and waste. Investment is particularly required for support for collaboration with complementarities for co-engineering.
- Policy recommendations include the need to identify and better analyse investment patterns and trends across the industries and countries; need to promote technology transfer and technology uptake along value chains; and need to raise awareness, especially for SMEs working along value chains, about specific funding opportunities.

Investment Report 2017/2018: From recovery to sustainable growth **published by The European Investment Bank (EIB).**

- Investment growth in the European Union (EU) reached an average annual rate of 3.2% in the period 2013-2016, clearly exceeding the pre-crisis (1995-2005) average of 2.8%. This investment recovery has been supported by an economic recovery in the EU that is gaining momentum, with rising levels of employment and disposable income, and improvements in consumer and business confidence.
- The rate of corporate investment has recovered to pre-crisis levels. This is reflected in the strong contribution of investment in machinery and equipment and intellectual property. However the rate of growth of corporate investment is still below what might be expected in a strong recovery episode, despite several years of underinvestment and the challenges imposed by technological change and global competitiveness.
- Government investment continues to remain low as a share of GDP in the EU, levelling out at 2.7% in 2016, the lowest level in 20 years. The contraction in government investment continued to be significant in the periphery countries – down to 2.1% - while the cohesion countries saw a sharp

decline from high levels linked to the funding cycle of the European Structural and Investment Funds (ESIF).

- While the economic and investment recovery has become more broad-based, there is still a need for policy action to maintain conducive financing conditions, re-prioritise infrastructure investment, improve the business environment, and address the pressing structural challenges facing Europe.

EIB Investment Survey 2017 - United Kingdom **published by EIB is an EU-wide survey of some 12,300 firms that gathers information on investment activities by both SMEs and larger corporates, their financing requirements and the difficulties they face.**

- The upcoming departure from the EU weighs on economic performance, as growth is slowing, inflation is outpacing wage growth and the post-Brexit conditions remain uncertain.
- More firms increased than reduced investment in the last financial year, but the share of firms that expect to increase investment in the next financial year has fallen, while short term factors driving investment are expected to deteriorate across the board.
- Investment in the last financial year was at 86% this is a slight increase compared to the previous wave (83%). Among all firms, almost four in ten developed new products, processes or services as part of their investment activities, with 6% claiming the innovation to be a global innovation. At the same time, some 13% of firms foresee no investment over the next 3 years.
- 12% of firms report investing too little over the last three years, similar to the EU average, but slightly lower than last year (15%). The average share of state-of-the art machinery and equipment in firms is below the EU average (32% versus 45%). This is also the case - though to a lesser extent – for building stock satisfying high efficiency standards (33% versus 39% across the EU).
- Barriers to long term investment have increased. As in the EU, uncertainty about the future and availability of staff continue to be perceived as the main barriers, but high energy costs are also noteworthy for UK firms.
- UK firms are more often using internal funds than before, but the increased reliance is not considered problematic by firms. The share of finance constrained firms remained low at 6%.
- Firms' productivity is broadly comparable to the EU as the performance of the most productive firms has fallen. Larger firms with 250+ employees make a greater contribution to value added than in the EU.

GROWTH FINANCE

Matching the crowd - Combining crowdfunding and institutional funding to get great ideas off the ground **published by Nesta, examines the impact matched crowdfunding through analysis of a £251,500 matched crowdfunding pilot for arts and heritage projects.**

- There are many different impacts of crowdfunding:
  - One of the financial impacts of matched crowdfunding is that the offer of a match increased the average size of backers' contribution from £63 to £74, making projects more likely to succeed in reaching their funding target.
  - The non-financial impact would include offers of help or voluntary work with the project (42% of all fundraisers), giving feedback/advice on campaign design (38%) and making introductions and connections to potential collaborators or funders (45%).
  - Crowdfunding can attract and motivate backers and fundraisers. Social media channels are vital for crowdfunding to work, 48% of backers first heard about the project they supported through their social media channels.
- One of the main challenge of the pilot project is that sometimes information gathered on projects was not always strong enough to make detailed value judgements on their work i.e. the lack of transparent budgeting.
- Recommendations include:
  - Funders should help organisations make the most of crowdfunding through investing in crowdfunding skills alongside providing match funding.
  - Crowdfunding platforms should continue to develop bespoke services to fit with the needs of funders and rigorously measure and share evidence of what works.
  - Arts and heritage organisation should explore using crowdfunding as a fundraising and engagement tool. They should also try and identify projects that could be crowdfunded and use

crowdfunding to demonstrate the value of new ideas that can help attract larger amounts of follow on funding.

Business Angel Spotlight **published by British Business Bank, examines latest developments in angel investment in the UK finance market.**

- Business Angel investors have been increasingly recognised as an important source of equity capital at the seed and early stage. In 2016 most Angels invested in 5 companies or fewer and are expected to hold their investment for 3-5 years.
  - 69% invested in 1-5 companies in 2016.
  - 57% of investments are expected to last 3-5 years; investments that are expected to last between 6-7 years and 7+ years is 19%; and those investment lasting less than 3 years is 1%.
- The most common areas of investment are in London (58%) and the South East (33%), whilst investment in Northern Ireland is at 6%.
  - Biggest sector that Business Angels invest in is healthcare and digital health (27%) and the smallest investments goes to gaming (3%).
- Half of Angels invested less than £50,000 in 2016. The highest value investments reported (by 1%) were over £1,000,000.
  - Volume of 2016 investment compared to previous year saw an increase of 41% who invested more money; and a decrease in those who invested less (26%).
- A high proportion of Business Angels co-invested with finance providers in 2016. 86% co-invested with at least one of these groups:
  - Other Angel syndicates; VC funds; equity crowdfunding platform; grants; angel co-investment funds; loan/debt; and other alternative finance.
- Factors that have a very important influence on the decision to invest include the character or their connections with the entrepreneurs mentioned by 20% of respondents whilst theimportance of the entrepreneurial team to have the relevant skills/ experience was considered to be important by 92% of respondents.
- Challenges that Business Angels face in the next 12 months include the political and economic environment i.e. UK's exit from the EU, but there were also a range of more pragmatic concerns such as the lack of time or money and the difficulties in identifying good investment opportunities.

BUSINESS REGULATION

[No relevant material sourced for this quarter's release.]

Succeeding Globally

TRADE

Northern Ireland Broad Economy Sales & Exports Statistics 2016 **published by NISRA measures local businesses' sales to markets outside Northern Ireland (NI) and estimates the number of businesses selling to markets outside NI.**

- Over the last year, total sales increased by 2.7% (£1.8 billion). This was largely driven by increasing sales within NI (up 1.9% or £829 million), GB (up 2.0% or £281 million) and exports (up 7.3% or £686 million).
  - In 2016, 35.0% of total sales were made to customers outside NI (external sales). This equated to £24.1 billion, representing an increase of 4.2% (£967 million) over the year. Exports to the Republic of Ireland (RoI) increased by £73 million (2.2%) over the year, to £3.4 billion.
  - Sales outside the UK (exports) were estimated to be worth £10.1 billion in 2016. This represented an increase of 7.3% over the year, and follows a decrease in the previous period (2014 – 2015) of 1.6%
- Exports to the Rest of the EU (RoEU, excluding RoI) increased over the year by £200million (9.4%) to £2.3 billion. Exports to the Rest of the World (RoW) increased by £414million (10.4%) over the year, to £4.4 billion.

- Over the calendar year 2015 to 2016, the estimated number of businesses selling to destinations outside NI rose by 1.7% (201 businesses) while the number of businesses exporting (i.e. selling outside the UK) rose by 0.7% (57 businesses).

Brexit and the UK automotive industry **published by NIESR considers short-run impacts, before turning to the impact of uncertainty on FDI inflows and then the nature of a possible trading relationship.** ***This article requires a subscription to access.***

- A starting point in understanding the impact of the Brexit vote on the UK auto industry is to consider its impact on the wider UK economy, both in terms of economic growth and the value of sterling. For example, a possible slowdown in economic growth is likely to impact on car sales in the UK, so at best car sales are likely to grow more slowly than otherwise and at worst may fall.
  - PA Consulting forecast a possible fall in UK car sales in the 5–10% range post Brexit referendum, while the consultancy firm LMC revised down its base forecast for the UK's light vehicle market by 15% to 2.55 million units for 2018.
- With the significant fall of the value of sterling in the aftermath of the Brexit vote, this should help boost UK auto output in the short term to over 1.8 million units. The immediate likely impact on UK auto would seem to be 'output up but domestic sales down'.
  - Imported cars and components will become more expensive for the consumer and industry alike. On average, only around 40% of the components that comprise a UK assembled car are sourced locally, as against 60% in Germany, given the nature of fragmented supply chains in UK auto.
- Companies assessing their assembly location will consider a range of issues in making such decisions, including: the relative cost differences between UK and EU locations; the dependency of sales of the particular model on the European versus the UK market; the relative importance of 'Made in Britain' to the brand (which is more relevant for premium and luxury brands); the volume of imported components.
- The Made Smarter Review has identified three themes which are limiting the UK's ability to achieve its potential:
  - Lack of effective leadership of industrial digitalisation in the UK. There is no clear narrative setting out what the UK already does well or the significant opportunity for UK industry from the faster development and adoption of IDTs.
  - Poor levels of adoption, particularly among SMEs. The UK is behind other advanced nations in overall productivity, which is in part due to lower levels of adoption of digital and automation technology. One of the identified causes is an ineffective and confused landscape of business support, with no clear route to access help and ambiguity about what 'good' looks like.
  - Under-leveraged innovation assets to support start-ups/scale-ups. The UK is a leader in research and innovation and has started to establish a support infrastructure to develop and commercialise technology. However, these innovation assets are under-leveraged and not focused enough on supporting IDT start-ups, meaning the UK is falling behind in creating new innovative companies and industries.

Sector by Sector: The Trade Costs of "No Deal" **published by the CBI analyses two types of barriers that UK companies would face if negotiators fail to secure a deal: tariffs on goods trade, and non-tariff barriers which make trade in both goods and services more complicated and costly.**

- In a "no deal" scenario, the UK would face tariffs on 90% of its EU goods exports by value.
  - Estimates suggest that if UK-EU trade were carried out under WTO Most Favoured Nation terms (MFN), the average tariff on UK exports to the EU (weighted by 2016 exports) would be 4.3%, but some of the UK's exports would experience tariff rates significantly higher than the average rate.
- The likelihood of tariffs on imports would amount to a double whammy for UK businesses. It has been estimated that the average MFN tariff on the UK's imports from the EU would be around 5.7%. The cost of tariffs on imported goods could therefore be more than double the cost on exports, reflecting the fact that the UK runs trade deficits across many categories of goods.
- Taking data on the tariff equivalents in different sectors, the CBI estimates that if UK firms were to face even half of the reducible costs that US companies face trading with the UK, this would be equivalent to an additional tariff of 6.5% on UK exports to the EU – nearly double the average MFN tariff.

- Non-tariff barriers (NTBs) are therefore likely to have a more significant impact on competitiveness than tariffs, especially for smaller companies. There is a significant degree of variation in the impact NTBs would have between different sectors.
  - Companies in sectors such as food, chemicals, aerospace and automotive would face particularly high NTBs. These industries are highly regulated, usually for safety reasons. Companies in these sectors would face significant additional "behind the border" requirements if no deal is struck i.e. testing requirements, labelling & packaging requirements, and product quality or performance requirements in order to export.
  - There are a number of sectors which would face only a moderate increase in NTB costs without a deal i.e the electrical machinery & electronics industry, and those trading in metals, wood & paper products. All of these industries would still face an increase in NTBs compared with today, in the form of customs procedures which make trade more complicated, less efficient and affect competitiveness by creating a wedge between the domestic price and foreign price of the good.
- If the UK is unable to secure agreements covering access to the single market in services, companies in some of the most successful exporting sectors would be unable to export specific types of services at all. Those industries include financial services, airlines, broadcasting and a range of professional and business services.

Trade after Brexit **published by Institute for Government explores the options facing the UK and asks what the scope is to negotiate an arrangement between Norway and Canada.**

- The UK will have to make a fundamental choice if it wants to stay as close as possible to the EU's regulatory model. The choices are to maintain as friction-free a relationship as possible with regards to market access or the option of far fewer obligations and choosing a different regulatory path, with greater potential for an independent trade policy.
- The 'bespoke Norway' option, if negotiable, would provide the closest alternative to the current level of market access and would be the least disruptive option for UK-EU trade, not least because it would effectively maintain membership of the Single Market.
- An EU-UK Deep and Comprehensive Free Trade Area (DCFTA), built on the Ukraine model, would provide partial access to the Single Market, but only where the UK agreed to continue to align with EU rules and accept oversight by supranational bodies.
- The new 'regulatory partnership' model would be a middle way that allows the UK and EU relationship to evolve over time. This will involve continued alignment with EU rules in some areas (so-called 'core tier') but in others, it would give the UK flexibility to choose whether to remain aligned to EU rules, with decisions to move away from the EU's regulatory sphere coming with market access consequences.
- The UK's political objectives are most compatible with 'Canada plus' option, perhaps with better access for services and agriculture, and closer regulatory co-operation. But the introduction of non-tariff barriers for goods and the loss of access for services mean this option would entail the most significant economic disruption of all options.

Globalisation patterns in EU trade and investment **published by Eurostat.**

- In 2016, the global value of exports of goods and services was EUR 14.6 trillion (or EUR 14 600 billion), this was the highest level of trade in goods and services recorded, unsurprisingly, in some of the biggest economies, as the EU-28 exported more goods and services (EUR 2.6 trillion) than any individual country, while the highest level of imports was recorded by the United States (EUR 2.5 trillion).
- Since the global financial and economic crisis, the value of the exported goods leaving the EU-28 has risen at a faster pace than the value of EU-28 imported goods. In 2016, the main three destinations for goods exported from the EU-28 were the United States, China and Switzerland.
  - Many developed world economies have experienced a relative stagnation in the value of their trade in goods since 2012, part of which may be linked to the impact of changes in oil prices.
  - The EU-28 accounted for around 15% of the world's trade in goods in 2016.
- The EU-28 leads the world in terms of the value of its international trade in services; it accounted for 23.9% of global exports in 2016 and was particularly specialised in exporting other business services (which include management consultancy, legal or marketing services).
- The stock of foreign direct investment (FDI) in China more than quadrupled between 2008 and 2015. The share of the EU-28's outward and inward stocks of FDI relative to GDP consistently rose during

the period 2008-2015. There were sizeable disinvestments in the EU-28 during 2014, followed by a sharp rebound in 2015, driven by an upturn in mergers and acquisitions activity.

- In 2015, the EU-28 accounted for more than one third (37.4 %) of the world's outward investment flows.

INWARD INVESTMENT

Going global: attracting international investment **published by Scottish Enterprise discusses investment market trends, Scotland's strong performance and analyses what sectors the investments are going to.**

- There was a decline in the total equity invested into companies in the UK during 2016, falling back from the highs achieved in 2015 and this was consistent with global trends. During 2016 the UK continued to see venture capital and institutional investors from overseas, some were particularly targeting and investing into Scottish companies.
  - In 2016, Scotland's companies secured £336 million, the second highest investment total recorded since 2001. This total included £153 million of Venture Capital "VC" investment.
  - The Scottish ICT sector has seen a healthy interest from investors, in 2016 it received £153 million VC investment that came from overseas.
  - Scotland's risk capital market also experienced the highest number of investment deals on record – 285 deals, a 33% increase on the year before.
- Scottish companies secured investment from geographically diverse investors including from Asia, North America and Europe. As well as critical funding, these international investors bring new skills and expertise to the companies they invest in.
  - In September 2016, TC BioPharm successfully secured investment from Nipro Corporation, a Japanese medical equipment manufacturing company and the Scottish Investment Bank. This funding has supported the expansion of facilities and progression of further product development.

China Going Global Investment Index 2017 **published by the Economist Intelligence Unit, presents information on what countries and sectors China's overseas direct investment goes to and provides indicators as to how China's decides which countries to invest in.**

- The top-ten ranked countries in the China Going Global Investment Index are still dominated by developed economies, but emerging economies have recorded notable gains. Singapore has leapfrogged the US to take the top slot, while Hong Kong has moved up to third.
  - Top ten countries China is investing in are Singapore, US, Hong Kong, Malaysia, Australia, Switzerland, South Korea, Canada, Chile and Russia.
- Countries that rank consistently highly across the six industry indices include the US, Japan, India and Iran. While the US and Japan owe their positions mainly to the opportunities they offer Chinese firms to obtain technology and brands through mergers and acquisitions (M&A), India and Iran are fast-growing markets in which companies from China are likely to be competitive.
- Looking by industry such as the automotive sector the attractiveness of overseas direct investment (ODI), China invests the most into Japan then its followed by the US and Iran.
  - In the past five years ODI in the automotive sector amounted to US$27.3bn, with over 80% of that figure consisting of mergers and acquisitions. Europe took up the largest share of China's ODI across the global automotive industry, at 60%, while Africa accounted for the lowest, at 5%.

Economic Integration, Foreign Investment and International Trade: The Effects of Membership of the European Union **published by CEP investigates the importance of deep economic integration in jointly fostering foreign investment and international trade for the participating members.**

- EU membership increases FDI inflows by between 14% and 38% depending on the choice of econometric technique. Between 1985 and 2013 EU membership led FDI inflows to be greater, on average, by about 28%.
- Countries that choose to leave the European Union may suffer significant falls in the inflows of foreign direct investment in addition to major disruptions to their trade flows. While the impact on trade will be perhaps twice as great, the effects on FDI are also large, in the order of 14 to 38%.
- FDI is important for economic growth and efficiency, because the entry of foreign firms in the domestic market increases competition and shores up technological innovation both in terms of product and process.

- Trade is a critical element of global integration but FDI plays a special role in the development of host economies because as a factor input, foreign investment can generate significant spillover benefits horizontally across the industry.
- Baier et al. (2008) estimate that membership in the European Union leads to increases in bilateral international trade of the order of between 127% and 146% in 10 to 15 years after joining. This compares favourably with equivalently estimated benefits from shallow integration as they also find that membership in the European Free Trade Association (EFTA) as effects are estimated only about 35% over the 10 to 15-year period following the start of membership.

TOURISM

August highest month ever for overseas visitor spending in the UK **published by Visit Britain, presents figures on how much overseas visitors have spent during their visit to the UK.**

- Overseas visitors spent £2.8 billion in August, up 3% on the same month last year.
- It was a record August for inbound visits to the UK, with 3.9 million visits, up 5% on the same month in 2016.
- There was particularly strong growth in August in visits from EU countries, the UK's largest visit-generating region, with 2.4 million visits, up 6%.
- These figures bring the total number of overseas visits to the UK from January to August to 27.1 million, up 8% on 2016. Spending by visitors during this period reached a record £16.4 billion, up 10% on last year.

Visit Britain forecasts the spending levels of overseas visitors to the UK for 2018 in *Tourists to UK forecast to spend record level in 2018.*

- Overseas visits to the UK are forecast to break through the 40 million mark for the first time in 2018, reaching 41.7 million, up 4.4% on 2017 which is expected to see 39.9 million visits.
- Spending by overseas visitors to the UK is forecast to reach £26.9 billion in 2018, up 6.8% on 2017 which is expected to total £25.1 billion by year end.
- There were 5 million visits from the 'Rest of the World' region in the first nine months of 2017, which includes markets such as Australia, China, the Gulf markets and India, up 15% on last year.
- There have been 3.8 million visits from North America from January to September 2017, up 14% on 2016.

Economic Infrastructure

ENERGY

Energy transition: Mission (im)possible for industry? **published by McKinsey & Company based on a research study on Dutch industries.**

- Decarbonizing industry 60% by 2040 will cost approximately EUR 23 billion:
  - The Dutch industrial sector can lower its carbon dioxide emissions by 60% by 2040 and 80% by 2050, which would be consistent with the European Union's goals of an 80% to 95% reduction by 2050.
  - Under current commodity and technology prices, only about 20% of investments have a positive business case. This assumes that the cost of carbon emissions ranges between 10 and 300 EUR per ton avoided CO2. Decarbonising industry by 95% is also possible but more costly.
  - The cost of decarbonising the Dutch industrial sector by 95% could be as high as EUR 71 billion between now and 2050. About EUR 24 billion comprises capital investments, and the remaining EUR 46 billion pays for higher operating costs (at current commodity prices). If energy prices fall from their current levels, the total cost could be closer to EUR 36 billion.
  - Aiming for a 95% reduction would see fewer investments with a positive business case (under current technology and commodity price outlooks). More investments become financially viable as the price of carbon increases.
- Reducing process and heat production emissions would require the application of multiple decarbonisation options at once: efficiency improvements; electrification of heat production; change

of feedstock (e.g. switch to bio-based); changes in demand by increasing reuse, remanufacturing, and recycling; changes in the steel production process; and carbon capture and storage or usage. Together the selected combination of options could reduce direct CO2 emissions by 20 million metric tons by 2040.

- Implications for the broader energy system:
  - Increasing the roll-out of renewables would be needed to enable proposed electrification of industry. Towards 2040 industry would account for about two thirds of the projected power demand increase.
  - The electricity price will have a major influence on cost effectiveness and feasibility. The development of the Dutch power system over the coming years, and the resulting energy prices and changes in the availability of low-carbon energy sources, will have a major influence on the feasibility and cost effectiveness of industrial decarbonisation. It will also determine further technology choices and affect industry's international competitiveness.
  - Many business cases hinge on these commodity price outlooks. De-risking is needed to make the investment choices required.
  - Over time, a diversification of supply may be needed to meet baseload industrial renewable energy demand more effectively. Increased application of hydrogen can play a role here (either through use in hybrid or gas boilers, or for backup power generation).

***Clean Growth: How to boost business energy productivity*, published by Policy Exchange considers a new approach for government; an approach that encourages investment in business energy efficiency to reduce carbon emissions and improve business productivity.**

- Given the apparent cost savings (UK businesses are paying out on estimate between £1.3 and £1.6 billion too much on their energy bills every year because they are not implementing energy efficiency measures) and productivity gains from energy efficiency, it is sensible to ask why businesses have not already realised these energy saving opportunities.
  - Informational barriers or a lack of information about what measures need to be taken and how they should be implemented. Informational policies do exist to overcome this such as the Energy Saving Opportunity Scheme (ESOS) and mandatory carbon footprinting.
  - Project economics. Over the years public policymakers have introduced a complex package of fiscal policies in order to stimulate and encourage energy efficient behaviour i.e. Climate Change Levy (CCL), Climate Change Agreements (CCAs), the Carbon Price Support (CPS), EU Emissions Trading Scheme (EU ETS) and Enhanced Capital Allowances (ECAs). Evidence suggests that fiscal policies have been a weak driver of action on energy efficiency. Protection for the most energy intensive industries should remain but only where there is clear evidence that the absence of CCAs would drive industry abroad.
  - Access to capital. In order to develop off-balance sheet finance models, accounting treatment must be carefully considered so that it is compliant with relevant accounting standards and regulations. This applies to both the private sector and public sector. This is vital as the interpretation of accounting rules is one of the main reasons that energy efficiency remains an area of significant under-investment.
  - Split incentives. The report has focussed on two types of split incentive- Landlord vs. Tenant and Procurement vs. Energy Manager. In the UK, as much as 50% of all commercial properties and 60% of Small and Medium Enterprises (SMEs) are rented from commercial landlords, which can limit their ability or desire to implement energy efficiency measures.

***Expanding Horizons: The Role for New Nuclear in the UK's Energy Mix* published by Respublica makes a new, broad case for new nuclear in the UK, and explains the significant and wide-ranging benefits involved.**

- The costs of building a new nuclear power station that will operate for 60 years or more are significant, and the risk attached to such large-scale projects is unavoidable. Britain's new nuclear programme, currently, is ready to go and is necessary to meet Britain's medium and long-term ambitions on both energy security and decarbonisation.
- Energy demand tends to ever be on the increase, so the UK will in the future require far more electricity than now. This is not necessarily a bad thing, and indeed could be celebrated by both those in favour of economic growth and by those deeply concerned about our environment.
- The UK will have the chance to capitalise on the drive to transition to reliable, carbon-free nuclear. Not only can investment in new nuclear create new, high-quality jobs in the UK, but it can prepare us to seize the global opportunities that any global shift to nuclear will present.

OECD published *Permit allocation rules and investment incentives in emissions trading systems*, offering a fresh perspective on the effects and the long term impacts of permit allocation rules on low carbon investment.

- The main result is that free allocation of tradable emission permits under current allocation rules has the potential to weaken incentives for firms to choose low-carbon technologies, compared to the situation where permits would be auctioned or a uniform tax were levied.
- Investors value carbon-intensive technologies higher than in the absence of free allocation, as free allocation increases profits, and this risks changing the ranking of technologies in terms of profitability.
- Free allocation can affect technology choice. The average permit price captures the effect of free allocation on total expected profits. If average carbon prices equalled marginal carbon prices, then permit allocation would not affect project rankings, so would be technology-neutral.
- Current allocation rules lead to weak incentives for low-carbon investment. In the short-run it is costly, yet possible, to become informed on which products are close substitutes. While benchmarks might thus be able to approximate technology-neutrality in the short-run, the analysis suggests that there is ample room for improvement. In the long-run one cannot know about the substitutability of goods, implying that benchmarks cannot be technology-neutral over longer time horizons.

***Investing in energy efficiency: investigating the total costs to business* published by Department for Business, Energy & Industrial Strategy (BEIS) examines 30 companies, according to their size and structure, and assesses the total costs faced when investing in energy efficiency measures.**

- 9 of the 30 participants reported that corporate-led carbon and energy reduction targets helped drive the investigation of investment in energy efficiency and low carbon heating measures.
- 17 out of 30 organisations reported that they were risk averse with regard to retrofitting energy efficiency measures, and their attitude to risk had a significant impact on investment decisions and processes.
- The greatest risk cited by participants was the potential for any detrimental impact of energy efficiency measures upon production or quality of products.
- The scale of capital costs associated with energy efficiency measures cited by participants ranged from £3,500 to over £50 million. In many cases the 'capital costs' described by participants included all costs with no differentiation between capital and non-capital costs.

TELECOMS

***Connected Nations 2017* published by OFCOM outlines the main developments in coverage and performance of fixed broadband and mobile networks, as well as network security and resilience.**

- It is estimated that around 1.1 million UK premises (4%) do not have access to a decent broadband service. This problem is affecting businesses in rural areas as 17% in these premises cannot receive decent broadband services compared to just 2% in urban areas.
- Northern Ireland is particularly poor for indoor coverage, this is likely because there is a greater proportion of properties in Northern Ireland that are dispersed throughout the countryside, compared to other nations.
  - Indoor coverage of telephone calls for the UK is 90% while Northern Ireland sits at 78%. England has the best indoor coverage with 91%.
  - Outdoor geographic coverage for telephone calls in the UK is 70%, Northern Ireland is 83%. However, England have the best overall outdoor coverage with 88% covered and Scotland has the lowest with 40%.
  - Motorway coverage for telephone calls for the UK is 97% but for Northern Ireland it is 91%, this is the lowest out of the four regions with Wales coming out on top with 99% coverage. .
- 17% of premises in the UK's rural areas cannot receive decent broadband services, compared to just 2% in urban areas.
  - In Northern Ireland, less than 1% of urban properties cannot receive decent broadband, compared with 23% of rural properties. In Scotland, 2% of urban properties cannot receive decent broadband, compared with 27% in rural Scotland.

- It is estimated that around 230,000 small businesses (7%) cannot receive a decent broadband service, compared with 4% for the population as a whole. These will benefit from the UK Government's planned broadband Universal Service Obligation (USO).
  - Northern Ireland coverage for small businesses that receive: superfast coverage is 75%; full fibre coverage 0%; and cannot get decent broadband 12%.
- Full fibre services are currently available to around 840,000 (3%) of UK premises, up from 2% last year. Smaller companies provide around half of this coverage. An increase is expected in the coming years, as a number of network operators have recently announced plans to extend their full fibre networks.

Digital Infrastructure Overcoming the digital divide in China and the European Union **published by CEPS, analyses the need to bridge the digital divide (in terms of usage and access to digital infrastructure) in order to reduce the socio-economic disparities within and between China and the EU.**

- There are four major challenges in overcoming the digital divide in emerging economies:
  - Insufficient levels of development in digital infrastructure and services rooted in low levels of investment in past years, due to both limited financial resources as well as missing political will. Nonetheless, this trend has been recently reversed in some emerging economies;
  - Limited affordability of network services, devices and applications. Nearly two billion people do not have a mobile phone therefore public actions are needed to bridge the digital divide, which also requires making ICT devices and internet access more affordable for the most remote and disadvantaged population segments;
  - Insufficient levels of basic and advanced digital skills to create or add value to the entire economy. This challenge means that internet users, especially in emerging economies, cannot create added value even when they have access to the internet, ICT devices and applications. The essential lesson of this challenge is that, without proper education and skill training, the potential of digital technology cannot be fully tapped;
  - Too little coordinated effort to enhance social and economic cohesion. In the absence of coordinated efforts, the opportunity to leverage new technologies to benefit society as a whole is missed.
- Recommendations include the formulation, at the international level, of general principles to overcome disparities between emerging and advanced economies; and general policy guidelines a country should follow to bridge the digital divide and foster inclusiveness among its population.

Government

NORTHERN IRELAND

[No relevant material sourced for this quarter's release.]

ENGLAND

Industrial Strategy: Building a Britain fit for the future **published by HM Government, sets out the UK's vision for the future economy and strategy to boost productivity.**

- The strategy addresses four grand challenges: put the UK at the forefront of the AI and data revolution; maximise the advantages for UK industry from the global shift to clean growth; become a world leader in the way people, goods and services move; harness the power of innovation to help meet the needs of an ageing society.
  - To achieve each of these grand challenges expert advisors from industry and academia will work alongside ministers, led by a 'Business Champion', all appointed early in 2018. Whilst the government will use regulation, funding and Sector Deals to achieve success.
- The UK government will use the 5 foundations of productivity to create an economy that will boost productivity with:
  - Ideas: to be the world's most innovative economy; key policies include raising total R&D investment by 2027, increasing the rate of R&D tax credit, and investing in a new Industrial Strategy Challenge Fund to capture the value of innovation.

- People: to generate good jobs and greater earning power for all; key policies include the new technical education system; additional investment in maths, digital and technical education; a new National Retraining Scheme that supports people to re-skill.
- Infrastructure: a major upgrade to the UK's infrastructure; key policies include boosting the digital infrastructure including through the roll-out of full-fibre networks.
- Business environment: to be the best place to start and grow a business; key policies include Sector Deals – government/industry partnerships to increase productivity in particular sectors such as life sciences, construction, AI and the automotive sector; launching actions that could be most effective in improving productivity and growth of SMEs.
- Places: to have prosperous communities throughout the UK; key policies include Local Industrial Strategies that build on local strengths and deliver on economic opportunities; creating a new Transforming Cities fund that will provide finance for intra city transport.

- A number of the Challenge areas offer significant opportunities for Northern Ireland's businesses and universities including:
  - Services: Belfast is ranked as the UK's number one destination for fintech and cybersecurity, and is home to first-rate examples of industry and academia collaboration in the Capital Markets Collaborative Network.
  - Energy revolution: Northern Ireland currently has significant research capability and expertise within its universities and colleges, including Ulster University's Centre for Sustainable Technologies and the Centre for Advanced Sustainable Energy at Queen's University.
- The Industrial Strategy contains a number of policy measures to benefit Northern Ireland, including:
  - Sector Deal agreements with a number of Northern Ireland's most important sectors: automotive, construction, life sciences and AI.
  - A new Strength in Places Fund to support innovation excellence that can demonstrate a strong impact on local growth.
  - Increasing national R&D spending to 2.4% of GDP by 2027, boosting Northern Ireland's research and innovation base, and offering new opportunities for innovative companies to bid for funding through the Industrial Strategy Challenge Fund.
  - A commitment to work with partners to consider how Local Industrial Strategies could deliver for places in Northern Ireland in future.
  - Boosting digital infrastructure with over £1 billion of public investment, including £176 million for 5G and £200 million for local areas to encourage roll out of full fibre networks.
  - Negotiations will be opened for a Belfast City Deal as part of a commitment to a comprehensive set of city deals across Northern Ireland.

The Clean Growth Strategy **published by BEIS sets out proposals for decarbonising all sectors of the UK economy through the 2020s.**

- In 2016, 47% of the supply of the UK electricity came from low carbon sources, around double the level in 2010, and now the UK has the largest installed offshore wind capacity in the world. Homes and commercial buildings in the UK have become more efficient in the way they use energy which helps to reduce emissions and also cut energy bills, for example average household energy consumption has fallen by 17% since 1990.
  - Automotive engine technology has helped drive down emissions per kilometer driven by up to 16% and driving a new car bought in 2015 will save car owners up to £200 on their annual fuel bill, compared to a car bought new in 2000.
- As a result of technological innovation, new high value jobs, industries and companies have been created. Thus driving a new, technologically innovative, high growth and high value "low carbon" sector of the UK economy.
- The UK government has identified areas which require the greatest progress, both through technological breakthroughs and large-scale deployment, if the UK is to meet the fifth carbon budget through domestic action.
  - Actions needed to be taken are: develop world leading Green Finance capabilities by setting up a Green Finance Taskforce; develop a package of measures to support businesses to improve their energy productivity by at least 20% by 2030; improve the energy efficiency for UK homes; reduce power costs for households and businesses by implementing the smart system plan.

The Department for Business, Energy and Industrial Strategy (BEIS) published *industrial decarbonisation and energy efficiency action plans* setting out government and industry commitments to reduce greenhouse gas emissions and improve energy efficiency.

- The action plans are the result of joint working between government and industry to identify voluntary commitments from all parties to enable sectors to decarbonise and improve their energy efficiency. They cover cement; ceramics; chemicals; food and drink; glass; oil refining; pulp and paper.
- Parties have committed to support the research, development and demonstration (RD&D) of innovative technologies, and to collaborate and share knowledge within the constraints of competition law. Government is running a £9.2m Industrial Energy Efficiency Accelerator (IEEA) programme to demonstrate close-to-market-ready industrial energy efficiency technologies and launch a web portal to overcome information barriers through greater industry collaboration.
  - The UK Government will invest up to £20m in a fuel switching innovation programme aimed at overcoming the barriers holding back deployment of alternative fuels.
- Replacing fossil fuel sources with biomass, which absorbs CO2 during growth, in a sustainable manner is an important decarbonisation technology for several sectors including cement, pulp & paper, chemicals, glass, food and drink and ceramic industries. Government will establish a cross-sector group that will develop a collective industry view of the best uses of bioenergy and provide greater clarity on the role of biomass and its availability, security of supply and costs.

SCOTLAND

Scottish Energy Strategy: The future of energy in Scotland **published by the Scottish Government, provides an insight on the 2050 vision for energy in Scotland acting as a guide not only for the Scottish Government but also for partner organisations on the decisions they will need to make over the coming decade.**

- To encourage energy efficiency Scotland will continue to take direct and supporting actions to improve the use and management of energy in Scotland's homes, buildings, industrial processes and manufacturing.
- Two new targets for the Scottish energy system by 2030: the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources. And an increase of 30% in the productivity of energy use across the Scottish economy.
- With regards to renewable and low carbon solutions Scotland will continue to champion and explore the potential of Scotland's huge renewable energy resource, and its ability to meet local and national heat, transport and electricity needs helping to achieve ambitious emissions reduction targets.
- Scotland will support investment, innovation and diversification across the oil and gas sector, working with industry to advance key priorities such as maximising the recovery of remaining resources, subsea engineering, decommissioning and carbon capture and storage.

Air Departure Tax in Scotland: An Economic Assessment **published by the Scottish Government, highlights the results of changes in Air Departure Taxes through detailed market segmentation and scenario-based analysis.**

- Three hypothetical tax scenarios were provided by the Scottish Government to represent potential Air Departure Tax (ADT) regimes for Band A (0 to 2,000 miles) and Band B (over 2,000 miles) tax rates as follows: Scenario 1: 100% cut in Band A (short haul), no change in Band B (long haul); Scenario 2: 100% cut in Band B (long haul), no change in Band A (short haul); and Scenario 3: 50% cut in Band A (short haul) and 50% cut in Band B (long haul).
- Under each of the scenarios three variants were tested with respect to the degree to which the tax reduction is 'passed through' to fares: a. Full pass-through of tax reduction by airlines to fares (100%); b. Partial pass-through of tax reduction by airlines to fares (50%); and c. No pass-through of tax reduction by airlines to fares (0%).
- For each of the scenarios modelled, the application of lower fares and / or supply side response resulted in:
  - A reduction in tax revenue in the region of the 50% advocated in the policy, noting that in some cases the reduction in revenue from existing passengers may be being offset to some extent by additional passengers, generating additional new tax revenue.
  - An increase in passenger numbers by market segment which differs widely by scenario. The biggest increase in passenger numbers is associated with: scenario one with full pass through of

tax reduction by airlines to fares; scenario two with partial pass through of tax reduction by airlines to fares by 50%; and scenario 3 no pass though of tax reduction by airlines to fares.

- A supply side reaction is unlikely to be immediate (depending on other commitments / timetable plans etc.), and consultations with airlines suggest that the lag time will vary by market segment. The modelling has assumed that any supply side reaction would be staggered over three years, beginning in 2019.

- Impacts on demand:
  - Scenario 1 and Scenario 3 typically produce greater increases in ADT payable passengers than Scenario 2. The smallest passenger number increases are seen with Scenario 2.
  - For any scenario, as the degree of assumed tax reduction pass-through reduces (i.e. progressing from Variant A to Variant C), the level of assumed supply side response (in the shape of new routes operated) increases. As the assumed supply side response is greater than the fares impact, under all scenarios, Variant C sees the greatest increase in passenger numbers.
  - By some margin, the biggest increase in passenger numbers is associated with Scenario 1c, where there is a significant demand side response, which affects some of the main market segments.

WALES

City Deals and the Regional Economies of Wales **published by the National Assembly of Wales, provides details of different City Deals the Welsh government has established that could improve the Welsh economy and encourage growth.**

- The Cardiff Capital Region City Deal was agreed by the UK Government, Welsh Government and the ten local authorities within the city region in March 2016. There will be a £1.2 billion Investment Fund, which will be invested in a range of projects over a 20 year period. Of this, £734 million will be allocated to the South Wales Metro and £495 million to other projects to support economic growth potentially.

- The Swansea Bay City Deal was agreed by the UK Government, Welsh Government and Swansea Bay City Region Board in March 2017. It will provide £1.3 billion of funding over 15 years, of which £637 million is from the private sector, £241 million from the Welsh and UK Governments and £396 million from other public sector organisations.

REPUBLIC OF IRELAND (ROI)

[No relevant material sourced for this quarter's release.]

Sources

Arcadis
https://www.arcadis.com/

The Association of Directors of Environment, Economy, Planning and Transport (ADEPT)
https://www.adeptnet.org.uk/

British Business Bank
https://british-business-bank.co.uk/

Catalyst Inc
http://www.catalyst-inc.org

CBI UK
http://www.cbi.org.uk

CBRE
https://www.cbre.com

CBRE UK
https://www.cbre.co.uk

Centre for Business Research (CBR)
https://www.cbr.cam.ac.uk

Centre for Economic Policy Studies (CEPS)
https://www.ceps.eu

Centre for Economics and Business Research (CEBR)
https://cebr.com

Centre for Enterprise and Economic Development Research (CEEDR)
http://www.mdx.ac.uk

Centre for European Economic Research (ZEW)
http://www.mdx.ac.uk

Department for Digital, Culture, Media and Sport
https://www.gov.uk/government/organisations/department-for-culture-media-sport

Department for Exiting the European Union
https://www.gov.uk/government/organisations/department-for-exiting-the-european-union

Department for the Economy
https://www.economy-ni.gov.uk

Department of Finance
https://www.finance-ni.gov.uk

Department of Jobs, Enterprise and Innovation (DJEI)
https://www.dbei.gov.ie/en

Department of Transport, Tourism and Sport
http://www.dttas.ie

Dept for Business, Energy & Industrial Strategy (BEIS)
https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy

Economic Advisory Group (EAG)
http://eagni.com

Economic and Social Research Council (ESRC)
http://www.esrc.ac.uk

Economic and Social Research Institute (ESRI)
http://www.esri.ie

Economics Ejournal
http://www.economics-ejournal.org

Economist Intelligence Unit
http://www.eiu.com

Enterprise Research Centre (ERC)
https://www.enterpriseresearch.ac.uk/

European Association of Research and Technology Organisations (EARTO)
http://www.earto.eu

European Commission - Enterprise and Industry - Growth publications
http://ec.europa.eu

European Investment Bank (EIB)
http://www.eib.org

Eurostat
http://ec.europa.eu

Federation of Small Businesses (FSB)
https://www.fsb.org.uk

GEM Consortium
http://www.gemconsortium.org

Green Alliance
http://green-alliance.org.uk

HM Treasury (HMT)
https://www.gov.uk/government/organisations/hm-treasury

Imperial College London - Business School
https://www.imperial.ac.uk

Institute for Fiscal Studies (IFS)
https://www.ifs.org.uk

Institute for Government
https://www.instituteforgovernment.org.uk

International Institute for Management Development (IMD)
https://www.imd.org

InterTradeIreland
http://www.intertradeireland.com

Invest NI
https://www.investni.com

Ipsos MORI
https://www.ipsos.com

Irish Exporters Association (IEA)
http://www.irishexporters.ie

Joseph Rowntree Foundation
https://www.jrf.org.uk

Journal of Business Research
https://www.journals.elsevier.com

Kiel Institute
https://www.ifw-kiel.de

Legatum Institute
http://www.li.com

LSE - Centre for Economic Performance (CEP)
http://cep.lse.ac.uk

LSE - Spatial Economics Research Centre (SERC)
http://www.spatialeconomics.ac.uk

McKinsey UK
https://www.mckinsey.com

National Assembly for Wales
http://www.assembly.wales

National Competitiveness Council (NCC)
http://www.competitiveness.ie

National Economic and Social Research Council (NECS)
http://www.nesc.ie

National Institute of Economic and Social Research (NIESR)
https://www.niesr.ac.uk

Nesta
http://www.nesta.org.uk

Nevin Economic Research Institute (NERI)
https://www.nerinstitute.net

NI Assembly Research and Information Service (RaISe)
http://www.niassembly.gov.uk

NI Council for Voluntary Action (NICVA)
http://www.nicva.org

NI Science and Industry Panel – MATRIX
http://matrixni.org

Northern Ireland Statistics and Research Agency (NISRA)
https://www.nisra.gov.uk

OECD iLibrary
http://www.oecd-ilibrary.org

Ofcom
https://www.ofcom.org.uk/

Office for National Statistics
https://www.ons.gov.uk/

Open Europe
https://openeurope.org.uk

Organisation for Economic Development and Co-operation (OECD)
http://www.changi-ilibrary.org

Oxera
https://www.oxera.com

Oxford Economics
https://www.oxfordeconomics.com

Oxford Review of Economic Policy
https://academic.oup.com

Parliament Briefings
https://researchbriefings.parliament.uk

Peterson Institute for International Economics (PIIE)
https://piie.com

PricewaterhouseCoopers (PWC NI)
http://www.pwc.co.uk

PricewaterhouseCoopers (PWC)
http://www.pwc.com/

Queens University Belfast – Economics
http://www.qub.ac.uk

Queens University Belfast - Research Centre in Sustainable Energy
http://www.qub.ac.uk

Resolution Foundation
http://www.resolutionfoundation.org

ResPublica
http://www.respublica.org.uk

Scottish Enterprise
https://www.scottish-enterprise.com

Scottish Government
http://www.gov.scot

Small Business Research Centre (Kingston University London)
https://eprints.kingston.ac.uk

Taxpayers Alliance
http://www.taxpayersalliance.com

Technical Research Centre of Finland (VTT)
http://www.vttresearch.com

Technopolis
http://www.technopolis-group.com

The Executive Office (TEO)
https://www.executiveoffice-ni.gov.uk

Tourism NI
https://tourismni.com

Trinity College Dublin
http://www.tcd.ie

Ulster University Economic Policy Centre
https://www.ulster.ac.uk/business/epc

University College Dublin (UCD)
http://researchrepository.ucd.ie

University of Ulster - Business Management Research Institute (BMRI)
http://uir.ulster.ac.uk/view/research_institutes/

Visit Britain
https://www.visitbritain.org

Visit Scotland
http://www.visitscotland.org

Wavteq
http://www.wavteq.com

Welsh Government
http://gov.wales

World Bank
http://www.worldbank.org/

World Economic Forum (WEF)
https://www.weforum.org