INTRODUCTION TO THE UK INNOVATION SYSTEM
### Creating Knowledge

**Stable, independent science and research funding sector:**
- Research Councils provide competitive grants for specific projects and programmes.
- Higher Education Funding Councils provide block grant funding to Universities on the basis of quality measured by the Research Assessment Exercise.
- £5.85bn govt spend for science and research from the budget in 2015-16 including both resource and capital expenditure.

**Good framework conditions for innovation:**
- Open and competitive markets, good IP regime, strong business and legal environment.

### Exploiting Knowledge

**Ranked one of the best countries in the world for University-business interaction:**
- Specific competitive funding streams for knowledge exchange such as the Higher Education Innovation Fund (HEIF).
- Growing networks of university exploitation funds like Fusion IP and IP group.
- Large and diverse public and private commercialisation sector.

**Direct and indirect government financial support:**
- Direct support for innovation through government agencies (eg £616million in 2014/15 for Innovate UK) is complemented by much larger indirect support – eg a comprehensive R&D tax credit regime (worth £1.2 billion in 2011/12) and further public support for venture capital and angel investment (eg the Enterprise Investment Scheme and the Seed Enterprise Investment Scheme).

### Supporting Innovation

#### Enabling Innovation

- **Universities**
- **Public Sector**
- **Research Establishments**
- **Research Funding bodies**

#### Supporting Innovation

- **Intermediary organisations**
- **Technology transfer offices**
- **Business incubation**
- **Science & innovation parks**

- **Standards Measurement Accreditation**
- **Intellectual property**
- **Lobbying and influencing policy**

- **Subsidies/grants/contracts for innovation**
- **Advisory services for innovation**
- **Networking**

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**INNOVATION TOOLKIT**

**A** INTRODUCTION TO THE UK INNOVATION SYSTEM

**B** COMPARATIVE PERFORMANCE OF THE UK INNOVATION SYSTEM

**C** UNDERSTANDING UK INNOVATION POLICY

**PUBLIC SUPPORT FOR INNOVATION IN THE UK (FEATURES AND CONDITIONS)**
Over 130 universities
Over 60 public sector research establishments
Range of cross-sector research partnerships
7 thematic Research Councils
4 higher education funding councils

Range of think tanks and campaigning organisations

Over 100 science and innovation parks
Over 50 university technology transfer offices
National initiatives bringing together universities and business
9 Catapult Centres (and growing)

4 national academies
1 national intellectual property office
1 national standards body

1 national innovation agency (Innovate UK)
A consolidated Business Growth Service
Over 70,000 members of the Knowledge Transfer Network
Several government-funded agencies
Many independent organisations that work closely with government
INTRODUCTION TO THE UK INNOVATION SYSTEM

INNOVATION TOOLKIT

B COMPARATIVE PERFORMANCE OF THE UK INNOVATION SYSTEM

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ANOTHER WAY OF LOOKING AT THE COMPLEXITY OF THE UK INNOVATION SYSTEM

SOURCE: THE DOWLING REVIEW OF UNIVERSITY INDUSTRY COLLABORATION, JULY 2015
The UK is a global leader in university-industry collaboration, but there are still challenges. A 2015 UK survey mapped the biggest barriers within the system. 

### Top ten barriers for **business**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IP and other contract negotiations are difficult to complete, processes difficult to navigate, or take too long</td>
</tr>
<tr>
<td>2</td>
<td>Business find it difficult to identify academic partners or where academic capability lies</td>
</tr>
<tr>
<td>3</td>
<td>Business and academia operate to different timescales</td>
</tr>
<tr>
<td>4</td>
<td>Lack of funding</td>
</tr>
<tr>
<td>5</td>
<td>Lack of alignment of objectives: tension between business and university needs or objectives</td>
</tr>
<tr>
<td>5</td>
<td>Lack of trust or mutual understanding</td>
</tr>
<tr>
<td>7</td>
<td>Businesses focus on the short term, rather than long term R&amp;D</td>
</tr>
<tr>
<td>7</td>
<td>Other funding issues (for example, SME eligibility, subjects within scope)</td>
</tr>
<tr>
<td>9</td>
<td>Low overall levels of business investment in R&amp;D, including a lack of absorptive capacity</td>
</tr>
<tr>
<td>10</td>
<td>Lack of understanding within business of potential benefits of working with universities</td>
</tr>
</tbody>
</table>

### Top ten barriers for **universities**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University metrics, including the REF, prioritise the production of high-quality publications</td>
</tr>
<tr>
<td>2</td>
<td>IP and other contract negotiations are difficult to complete, processes difficult to navigate, or take too long</td>
</tr>
<tr>
<td>3</td>
<td>Other pressures on academic time (teaching and research) limit resources for collaboration</td>
</tr>
<tr>
<td>4</td>
<td>Lack of funding</td>
</tr>
<tr>
<td>5</td>
<td>Collaborative experience not valued as part of academic career progression</td>
</tr>
<tr>
<td>5</td>
<td>Lack of time/resource for networking or project development</td>
</tr>
<tr>
<td>7</td>
<td>Business and academia operate to different timescales</td>
</tr>
<tr>
<td>7</td>
<td>Tension between academic desire to publish work, and business concerns about competition</td>
</tr>
<tr>
<td>9</td>
<td>Lack of trust or mutual understanding</td>
</tr>
<tr>
<td>10</td>
<td>Low overall levels of business investment in R&amp;D, including a lack of absorptive capacity</td>
</tr>
</tbody>
</table>
The following slides provide profiles of some of the main institutions in the UK innovation system. For each we:

- Describe its mission and how it works.
- Provide links to further information.

Since this guide was developed with international audiences in mind, we also offer examples of how it works internationally.
### MISSION

- Innovate UK is the UK’s innovation agency.
- Its goal is to accelerate economic growth by stimulating and supporting business-led innovation – bringing together business, research and the public sector, supporting and accelerating the development of innovative products and services to meet market needs, tackling major societal challenges and helping build the future economy.
- Its budget (2014/15: £616m) is directed towards technologies for which it has identified large global market opportunities which are also areas of UK strengths.

### APPROACH

- Innovate UK has invested over £1.5 billion since 2007 in helping UK businesses innovate.
- It supports innovation through a range of programmes which provide access to finance and access to knowledge, skills, equipment and partners.
- These include Catapult centres (see separate slide), SMART grants, innovation vouchers, Collaborative R&D programmes, feasibility studies, Knowledge Transfer partnerships and networks, challenge platforms (in energy • built environment • agriculture and food • healthcare • transport) and pre-commercial procurement programme, SBRI
- It has a staff of 325, largely drawn from industry.

### INTERNATIONAL COLLABORATION

- Although its work is focused on the UK, strategic international work is increasingly important to Innovate UK:
  - Helping firms access European research and development funding through the Enterprise Europe Network and Horizon 2020 National Contact Points
  - Working with UKTI on international trade missions for innovative SMEs and supporting innovative firms to export
  - A highly prioritised set of international collaborative R&D programmes
  - Implementing the translation strand of the Newton fund, a development assistance programme focussed on developing science and innovation partnerships to promote the economic development and welfare of 15 emerging economies.

### CONTACTS & FURTHER INFORMATION

- Innovate UK funding and support tools
- Innovate UK delivery plan (2014/15)
- 5 year strategy: Concept to Commercialisation (new strategy due Autumn 2015)
- Thinking about the future - Breakdown of Innovate UK spending
- Website: www.innovateuk.org
**MISSION**

- The Catapults are a network of technology and innovation centres created by Innovate UK.
- They have an ambitious goal to transform UK capability in innovation - initially in nine areas selected as priorities for economic growth.
- More than £1bn of public and private investment will be targeted at Catapults over the next few years.

**APPROACH**

- Catapults are business-focused technology and innovation centres that make world-leading technical capability available to businesses to solve their technical challenges.
- They aim to encourage business investment in R&D by providing facilities and access to expertise to test new ideas.
- They actively explore what conditions are needed to enable innovation and seek to influence these on behalf of their sector.
- There are currently 9 centres: High value manufacturing, cell therapy, offshore renewable energy, satellite applications, connected digital economy, future cities, transport systems, energy Systems and Precision Medicine.
- They are funded by a mixture of public sector grants and business funded contract research.

**INTERNATIONAL COLLABORATION**

Each Catapult has its own international strategy, and these are constantly evolving. Common themes across all of the Catapults include:

- Promoting their sector internationally, including helping SMEs access international business opportunities.
- Helping policy makers in the UK make sense of the international landscape for their sector.
- Several Catapults actively seek out international sources of funding, for example the Future Cities Catapult.
- Offering services to overseas companies, from data modelling to research facilities.

**CONTACTS & FURTHER INFORMATION**

- An introduction to each Catapult.
- The UK locations of each of the 9 catapults.
- Catapult to Success a review of international technology and innovation centres.
- Contact the catapults.
- Website: www.catapult.org.uk
MISSION

- Knowledge Transfer Network Ltd (KTN Ltd), which is funded by Innovate UK, is an interdisciplinary UK-wide network of knowledge intensive businesses and academics designed to stimulate innovation by promoting collaboration, best practice and knowledge sharing between industry and academia.
- The goal of KTN Ltd is to drive knowledge transfer between knowledge creators and knowledge users.

APPROACH

- KTN Ltd was set up in April 2014 to coordinate the work of the former 15 individual Knowledge Transfer Networks.
- It organises events in the UK and internationally for businesses and researchers to network.
- KTN missions have a broad focus, from sharing best practice to winning new business.
- KTN Ltd helps Innovate UK focus its funding calls by setting up Special Interest Groups on key emerging areas.
- It also has an online community with over 70,000 members, hosted on Innovate UK’s connect website.

INTERNATIONAL COLLABORATION

- KTN Ltd organises sector specific missions to priority countries, helping connect researchers and innovators in the UK with overseas opportunities.
- It can help UK organisations access overseas funding schemes.
- KTN Ltd works closely with Innovate UK on international funding programmes, for example Horizon 2020.

CONTACTS & FURTHER INFORMATION

The websites of each of the 15 KTNs, where you can find individual contact details, strategies and priorities:
https://connect.innovateuk.org/knowledge-transfer-networks
**MISSION**

- UK Trade and Investment (UKTI) has two main functions: helping UK business **export** and securing **inward investment** from international companies.
- In 2013 UKTI launched its Innovation is Great campaign to improve international perceptions of UK innovation, promoting the UK as a partner of choice to design, build and commercialise new technologies.
- This will see UKTI doing more at international science and innovation events and developing relationships with global science and innovation hotspots.

**APPROACH**

- UKTI is target driven. It has targets for trade, investment and the number of businesses helped.
- It offers a range of fee charging services which help UK companies to export and foreign companies to invest in the UK.
- UKTI set up the Innovation Gateway in 2014. It is a 'one stop shop' for securing S&I investment from international funds and companies. Over the next 2 years the organisation is tabled with unlocking £1 billion of investment and creating 500 new jobs.

**INTERNATIONAL COLLABORATION**

- UKTI organises overseas trade missions and offers grants for SMEs to attend these. 90 percent of the businesses it helps to export are SMEs.
- Together with other UK government institutions such as the Science and Innovation Network, it organises joint missions that combine research and innovation with business focussed activities.

**CONTACTS AND FURTHER INFORMATION**

- For more information on UKTI see: UKTI at a glance
- Website: https://www.gov.uk/government/organisations/uk-trade-investment
MISSION

- Research Councils UK (RCUK) is the strategic partnership of the UK's seven Research Councils:
  - The Research Councils have 3 objectives:
    - Investing in the creation, application and sharing of knowledge
    - Building partnerships
    - Support of significant innovation infrastructure

APPROACH

- The Research Councils fund research in universities and research institutes.
- They help researchers deliver social and economic impact by supporting them to engage and collaborate with the public, businesses, government and the third sector.
- This includes the development of collaborative research programmes and the support of impact focussed research facilities, such as Innovation and Knowledge Centres and Research and Innovation Campuses. While RCUK encourages research projects to have industrial partners they cannot fund businesses.

INTERNATIONAL COLLABORATION

- The work of RCUK is increasingly international: RCUK has offices in China, India, Europe and the US
- RCUK organises joint funding calls in a range of countries, including under the Newton Fund.
- It regularly organises research workshops for UK researchers around the world.

CONTACTS AND FURTHER INFORMATION

- The Research Councils' role in supporting innovation
- RCUK's international strategy
- The delivery plan for each of the 7 research councils
- Website: [http://www.rcuk.ac.uk/](http://www.rcuk.ac.uk/)
ENABLING INFRASTRUCTURE AND SOURCES OF ADVICE

Helps businesses understand how to manage IP in the UK and internationally. This includes IP attachés in key countries, IP country guides, and online tools.

http://www.ipo.gov.uk/

Promotes the importance of design to the economy and also promotes British design internationally.

www.designcouncil.org.uk

The learned societies are a source of expertise and also promote UK science internationally.

www.raeng.org.uk
https://royalsociety.org/

The UK’s national standards body, the BSI also provides services and seeks to build relationships with international counterparts, to create common standards, which helps UK innovations enter foreign markets.

http://www.bsigroup.co.uk/

NPL and the NMO are both UK institutions that focus on measurement and standards, developing and applying the most accurate measurement standards and ensuring accurate measurements are available

http://npl.co.uk/
http://www.bis.gov.uk/nmo

The Business Growth Service is a UK government-backed service that offers a range of support programmes to businesses that have the potential to grow.

http://www.ga.businessgrowthservice.greatbusiness.gov.uk/

An independent charity with a mission to help bring good ideas to life, Nesta is a leading innovation think tank, an investor in innovative ventures and an innovation lab testing out new approaches to supporting innovation.

www.nesta.org.uk/
COMPARATIVE PERFORMANCE OF THE UK INNOVATION SYSTEM
RECENT DECADES HAVE SEEN RAPID SHIFTS IN THE DISTRIBUTION OF GLOBAL SCIENTIFIC PRODUCTION, AND TO A LESSER EXTENT, EXCELLENCE


**Key**
- City with highest publication output in the period 2004-2008; growth is during 1996-2000
- Decreased or stayed constant
- Increased 5-10 places
- Increased 10-20 places
- Increased 20+ places

**Source:** Royal Society (2011)
RECENT DECADES HAVE SEEN RAPID SHIFTS IN THE DISTRIBUTION OF GLOBAL SCIENTIFIC PRODUCTION, AND TO A LESSER EXTENT, EXCELLENCE

INTERNATIONAL COLLABORATION NETWORKS IN SCIENCE, 1998
Whole counts of internationally co-authored documents

INTERNATIONAL COLLABORATION NETWORKS IN SCIENCE, 2011
Whole counts of internationally co-authored documents

Each node represents a minimum of 10,000 co-authored papers. The thickness of line indicates the intensity of collaboration.

The UK research system is highly efficient.

With 0.9% of the world’s population, 3.2% of global R&D spend, and 4.1% of researchers, the UK accounts for 9.5% of article downloads, 11.6% of citation and 15.9% of the world’s most highly cited articles. See learn more box below.

The OECD ranks the UK as second in the world for university hotspots due to concentrations of high impact institutions.

National share of world publications indexed on Thomson Reuters’ Web of Science, 2002-2011 (note that the right hand axis is for the US only)

SOURCE: NESTA (2013) CHINA’S ABSORPTIVE STATE
A similar shift is happening in the global geography of innovation. While there’s no doubt the UK is still a leading innovation nation, it can be harder to judge how it compares in terms of innovation performance.

The UK ranked second in the Global Innovation Index 2014:
1. Switzerland
2. United Kingdom
3. Sweden
4. Finland
5. Netherlands

Yet the European Commission Innovation scoreboard in 2014 ranked the UK as seventh in the EU and an ‘innovation follower’.

And London alone ranked sixth in the world in terms of its Startup Ecosystem in 2015.

How should we interpret these results?
All these indices are made up of a different basket of proxy indicators – from patents and publications to high tech industries, education levels of citizens or new products introduced by firms.

Indexes should always be interpreted with caution. Underlying data, collected at different levels of geography may be more helpful guides to policy decision making.
Compared to other advanced countries, the UK has a low level of total investment in R&D (GERD) and a low R&D intensity (GERD as a percentage GDP).

While countries like Germany, France and the USA have seen a steady rise in R&D intensity since the year 2000, it is steadily falling in the UK.

However, it is important to keep this in context: the UK comes in the top 20 of the 75 countries that the World Bank has R&D data for in terms of R&D intensity.

**GROSS DOMESTIC EXPENDITURE ON R&D 2012**

<table>
<thead>
<tr>
<th>Country</th>
<th>GERD</th>
<th>R&amp;D intensity (GERD as % of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>453544</td>
<td>2.79</td>
</tr>
<tr>
<td>China</td>
<td>243422</td>
<td>3.34</td>
</tr>
<tr>
<td>Japan</td>
<td>151837</td>
<td>1.98</td>
</tr>
<tr>
<td>Germany</td>
<td>100248</td>
<td>2.92</td>
</tr>
<tr>
<td>Korea</td>
<td>65349</td>
<td>4.36</td>
</tr>
<tr>
<td>France</td>
<td>51891</td>
<td>2.26</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>39110</td>
<td>1.72</td>
</tr>
</tbody>
</table>

**SOURCE:** OECD STAT EXTRACTS
**Size of Firm:** R&D spending is concentrated in a few very large firms:

- The 10 biggest R&D spenders in the UK account for 34% of all UK R&D expenditure
- SMEs accounted for only 3.5% of the total R&D spending

**Region:** R&D spending in the UK is not spread evenly across the country:

- The South East and East of England lead the UK’s BERD, accounting respectively for 26% and 20.9% of total expenditure.
- Wales, the North East and Northern Ireland spent the least on BERD, collectively accounting for less than 5% of total UK expenditure.

**Sector:** R&D spending is not evenly spread across sectors. Over 60% of firms in computer related industries conduct R&D, compared to less than 20% of firms in the construction industry.

**PERCENTAGE OF FIRMS PERFORMING INTERNAL R&D BY SECTOR**

- R&D (natural sciences and engineering)
- Computer and related activities
- Manufacture of electrical and optical equipment
- Manufacture not elsewhere classified
- Telecommunications
- Technical testing and analysis
- Manufacture of fuels, chemicals, plastics, metals and minerals
- Manufacture of food, clothing, wood, paper, publishing and printing
- Architectural and engineering activities
- Manufacture of transport equipment
- Motion picture and video production
- Financial intermediation
- Other business activities (exc SIC 74.2 & 74.3)
- Mining and quarrying
- Electricity, gas and water supply
- Sale, maintenance and repair of motor vehicles
- Renting
- Real estate
- Retail trade (exc cars & bikes) and repair
- Transport and storage
- Post and courier activities
- Hotels and restaurants
- Construction

*SOURCE: THE UK R&D LANDSCAPE (2012)*
The UK has many innovative firms and people, from world-beating creative businesses like Double Negative to its thriving business services sector; from advanced manufacturers like Rolls-Royce to world-class research universities; and from technology giants like ARM to the start-ups of Shoreditch. But their success masks low investment.

**BY BOTH GOVERNMENT:**

**TOTAL GOVERNMENT BUDGET APPROPRIATIONS OR OUTLAYS FOR R&D (GBAORD)**

Between 200,000 and 250,000 new firms are created each year in the UK. R&D spending tends to be concentrated. The Department of Business Innovation and Skills estimates that to secure future economic success, R&D intensity (now under 2%) needs to be closer to the 2.9% average of leading comparator countries.

**AND ALSO BY BUSINESS:**

Between 200,000 and 250,000 new firms are created each year in the UK. R&D spending tends to be concentrated. The Department of Business Innovation and Skills estimates that to secure future economic success, R&D intensity (now under 2%) needs to be closer to the 2.9% average of leading comparator countries.
Investment in R&D represents only a small proportion of the overall investment in innovation made by UK firms. Investment in design, branding, software development and organisational improvement are all important complementary innovation investments driving productivity growth.

International comparison of investment in innovation as a share of market sector gross value added

The UK performs much better in comparison to other countries when these wider intangible innovation investments are taken into account.

**Investments in innovation by business in the UK, 2011 (£bn)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Investment (£bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D</td>
<td>£16.8</td>
</tr>
<tr>
<td>Training</td>
<td>£33.6</td>
</tr>
<tr>
<td>Organisational improvement</td>
<td>£25.5</td>
</tr>
<tr>
<td>Software</td>
<td>£24.3</td>
</tr>
<tr>
<td>Design</td>
<td>£15.5</td>
</tr>
<tr>
<td>Advertising and Market Research</td>
<td>£13.5</td>
</tr>
<tr>
<td>Copyright</td>
<td>£5.8</td>
</tr>
<tr>
<td>Financial</td>
<td>£1.8</td>
</tr>
<tr>
<td>Mineral Exploration</td>
<td>£0.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£120.8</strong></td>
</tr>
</tbody>
</table>

**INNOVATION INDEX (NESTA 2014)**

**INTERNATIONAL COMPARISON**

- **Finland**: 14.6%
- **UK (Index)**: 14.1%
- **UK (HMT)**: 13.0%
- **US**: 13.5%
- **France**: 12.6%
- **Japan**: 10.5%
- **Germany**: 10.1%
- **Netherlands**: 9.4%
- **Canada**: 9.1%
The UK is a world leader in the creative economy - those economic activities which involve the use of creative talent for commercial purposes. For instance, according to Design Council research, every £1 that a UK business spends on design returns £20 in net turnover, £4 in net operating profit and £5 in net exports/new markets.

Within the creative economy, the creative industries specialize in the use of creative talent for commercial purposes – for instance film, design, music and video games.

**Mind Candy** is a success story of the British Creative Economy. Formed in 2003, it began developing children’s computer game Moshi Monsters in 2007.

Extraordinary growth has led to over 70 million registered users of the game worldwide and a turnover for the London based firm of £46.9 million in 2012.

Creative industries & economy contribute more to GVA than construction, advanced manufacturing or financial services. The creative economy accounts for 5% of the UK’s total economy.

SOURCE: A MANIFESTO FOR THE CREATIVE ECONOMY/ DCMS
Creative Economy Statistics Estimates
THE UK SCIENCE AND INNOVATION SYSTEM IS HIGHLY INTERNATIONALISED:

Around 46% of the UK’s scientific publications have an international co-author, and this share is growing rapidly. A growing proportion of research in UK universities is also funded from abroad.

An exceptionally high proportion of UK business R&D is funded from abroad: In 2011, the UK attracted almost $7 billion of overseas-financed R&D – the same as Canada, Finland, Japan, China, and Russia combined.

UK innovative firms are far more likely to be active in foreign markets than their counterparts in France, Italy or Sweden.

BUT IS THE UK GOOD ENOUGH AT EXPLOITING THE BENEFITS OF THESE INTERNATIONAL CONNECTIONS?

According to BIS research, some 80-90% of innovation in advanced economies is based on technology transfer from foreign countries.

An important priority for the UK is to increase its ability to exploit cutting-edge global research and to benefit from rapidly growing investment in innovation around the world.

Researchers at Manchester University celebrated important, ground-breaking achievements with the Nobel Prizes awarded for their work on graphene in 2010. Yet Chinese institutes already have vastly more graphene–related patents. A Cambridge IP study in 2013 counted over 2,200 patents in China compared to 54 filed so far in the UK.
A 2014 assessment of the strengths and weaknesses of the UK innovation system relative to other leading comparator countries by BIS makes the following assessment (adapted from the original):

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>ASSESSMENT¹</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONEY</td>
<td>Medium/Low</td>
<td>Strong foreign funding of R&amp;D, high private sector investment in intangibles</td>
<td>Comparative to global leaders, lower levels of R&amp;D investment and public support for innovation, issues around access to finance for innovative companies</td>
</tr>
<tr>
<td>TALENT</td>
<td>Medium/Low</td>
<td>Attractive to global research talent, high quality higher education system, high number of PhDs</td>
<td>Lower basic skills (ICT, numeracy etc), low number of STEM graduates, lower level of management skills</td>
</tr>
<tr>
<td>KNOWLEDGE ASSETS</td>
<td>Medium/high</td>
<td>World class research base (2nd only to US) and research institutions, high proportion of international research collaborations</td>
<td>Smaller number of patent applications than other leading nations</td>
</tr>
<tr>
<td>STRUCTURES AND INCENTIVES</td>
<td>Medium/high</td>
<td>Modern IP regime, competitive funding drives excellence, strong university-industry collaboration, strong knowledge networks</td>
<td>Government procurement underperforms its potential to foster innovation, weaker SME/University collaboration</td>
</tr>
<tr>
<td>BROADER ENVIRONMENT</td>
<td>Medium/high</td>
<td>Open and competitive markets, positive business environment, strong entrepreneurial activity</td>
<td>R&amp;D concentrated in a few large firms &amp; small number of sectors, low quality of demand, restrictive migration rules</td>
</tr>
<tr>
<td>INNOVATION OUTPUTS</td>
<td>Medium (Mixed)</td>
<td>Comparative export advantage in relatively sophisticated products, strong knowledge intensive services and creative sector exports, strong technology balance of payments</td>
<td>Average to low levels of new to market innovations, low number of innovative SMEs</td>
</tr>
</tbody>
</table>
London and the South East are the most innovation-intensive regions of the UK. However, there are a range of industrial clusters around the UK, and nationwide capabilities. These clusters display a range of innovative activity, and high tech employment can be found throughout the country, with notable concentrations for example in Manchester, Edinburgh and Cambridge.
**INTRODUCTION TO THE UK INNOVATION SYSTEM**

**A**

**I WANT TO UNDERSTAND HOW THE UK COMPARES TO OTHER COUNTRIES WHEN IT COMES TO SCIENCE AND INNOVATION**

A great place to start is The OECD World Bank Innovation Policy Platform; and regular digests are also produced by the European Commission (Eurostat) and the OECD: (OECD Main Science and Technology Indicators, OECD Science, Technology and Industry Scoreboard) or for a wider range of countries the World Bank.

---

**B**

**I WANT TO GET A DEEPER INSIGHT INTO INVESTMENT IN INNOVATION IN THE UK**

Look at the UK innovation survey which takes place every 4 years or so, or the ONS statistical bulletin which provides a useful overview of R&D spending in the UK. For a wider understanding of investment in innovation look at Nesta’s Innovation Index or for insights on skills look at HESA studies, or the UK CES Employer Skills surveys.

---

**C**

**I WANT TO UNDERSTAND THE UK’S STRENGTHS AND WEAKNESSES WHEN IT COMES TO INNOVATION**

The UK government commissions regular reviews like this Comparative performance of the UK research base, but companies like Elsevier and Thomson Reuters hold the (commercial) databases. The IPO frequently publish facts and figures on UK patenting and wider intellectual property, and WIPO publish helpful country profiles. There is now a searchable database of the impact of UK research and published reports such as Research Excellence Framework Impact case studies: Economic Impact of UK science base.

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**IF YOU WANT TO DO YOUR OWN ANALYSIS OF UK INNOVATION PERFORMANCE, HERE’S A HANDY GUIDE TO WHERE TO FIND GOOD DATA**

**I WANT TO FIND OUT ABOUT THE OUTPUTS AND IMPACTS OF UK SCIENCE AND INNOVATION**

For research specialisation look at government reports on UK research and innovation performance: Comparative performance of the UK research base; and for a regional picture, Mapping local comparative advantages. For Innovation specialisation look at individual Industry councils like ABPI for pharmaceuticals or UKIE for gaming; the regularly updated BIS growth dashboard or look for published reports on Eight great technologies: the patent landscapes, and UK’s economic strengths.

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**I WANT TO GET AN INSIGHT INTO THE UK’S STARTUP ECOSYSTEM**

There are vast commercial databases and accessible resources in companies house, and ONS. Organisations like Nesta, TechCityUK create accessible report collections and Spinouts UK hold a UK-wide database and support reports like Profiling UK University Spinouts. Lots of companies analyse investment and access to finance. For free public reports try BVCA which produce reports like Venture capital activity 2013 or Nesta’s wider work on startups and Alternative Finance. The European ICT Poles of Excellence project has an interactive dashboard you could use to compare UK startup ecosystems with those in other European countries

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**I WANT TO BETTER UNDERSTAND THE RELATIONSHIPS BETWEEN UNIVERSITIES AND BUSINESSES IN THE UK**

Take a look at the regular surveys by HESA and Praxis Unico or reports on Evaluation of UK knowledge transfer activities. For wider Intermediate research organisation data look at reports like Research and innovation organisations in the UK, the Catapult Centres or the UK contract research map.

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**I WANT TO UNDERSTAND THE INTERNATIONAL CONNECTIONS OF THE UK SYSTEM**

Explore FDI involving R&D/High tech exports data in regular digests like UKTI inward investment report 2014/15 or at source from World Bank and Eurostat. HESA, Universities UK and British Council will have data on student flows at a national level, complemented by OECD internationally.
UNDERSTANDING UK INNOVATION POLICY
AND MAPPING FUTURE STRENGTHS
Since the late 1970’s, UK innovation policy has been based on improving the environment for businesses to innovate and promoting and supporting general R&D investment rather than activist industrial policy.

However the financial crisis brought with it the realisation that the UK needs to rebalance its economy, both away from consumption towards investment and strengthening other sectors in relation to the financial sector.

In 2012 the UK Government launched its new industrial strategy, which shows businesses where and how the government plans to invest. The strategy has 5 strands, of which those directly relevant to innovation are sectors and technologies.

The strategy aims to:
- increase global competitiveness
- strengthen manufacturing supply chains
- support innovation
- maximise export potential where UK is well placed to take a global lead
TECHNOLOGIES:
In 2013 the Government selected 8 technologies as a framework to help focus investment in areas where the UK has a distinctive capability and where new technologies are emerging with identifiable commercial opportunities.

The 8 technologies are:

- big data
- satellites
- robotics
- synthetic biology
- regenerative medicine
- agriscience
- advance materials
- energy storage.

In 2014 government added quantum technologies and the internet of things to the list.

Click the learn more tab below to find out more about each technology.

Innovate UK prioritises its investments through understanding:

- how the market is developing within the UK and globally
- where the capability to answer the challenge lies along the development path
- who could be supported to develop products and services that answer the challenge
- what enabling technologies and competencies may be needed.

This analysis is used to create a roadmap of the potential activities required to support successful activities.
Innovation policy is currently developed and delivered at a national level, and has been since the closure of the English Regional Development Agencies in 2012.

There are many reasons for this, not least that the vast bulk of the science and innovation budget goes to Higher Education Institutions, based on an assessment of excellence rather than economic need. And of course, the Haldane Principle prevents Government from directing science spend.

However, policy emphasises the importance of local strategies to drive economic growth with innovation across the country, for example in the ‘Northern Powerhouse.’

Many of the 39 Local Enterprise Partnerships (LEPs) in England have identified innovation as a priority in their economic development plans, and all have drafted innovation strategies to access European funding that highlight their local comparative advantages (the EU refers to this as smart specialisation).
In 2012 the UK Foresight Horizon Scanning Centre used a futures exercise to set out where the UK has an opportunity to capitalise on its strengths in emerging technologies and markets.

Their research identified 7 cross-cutting areas where the UK’s current competitive advantage and the size of the potential market mean that they could provide the UK’s specialisms of the future.

These areas are reflected in the priorities of Innovate UK and the Catapult Centres.
## LEARN MORE

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<td>Allas, T. (2014) Insights from the international benchmarking of the UK science and innovation system. Available at: <a href="https://www.gov.uk/government/publications/science-and-innovation-system-international-benchmarking">https://www.gov.uk/government/publications/science-and-innovation-system-international-benchmarking</a></td>
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<td><strong>Research Councils UK. Our vision for international collaboration.</strong> Available at: <a href="http://www.rcuk.ac.uk/RCUK-prod/assets/documents/publications/international.pdf">http://www.rcuk.ac.uk/RCUK-prod/assets/documents/publications/international.pdf</a></td>
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<td><strong>UKIRC (2012)</strong> The UK R&amp;D landscape. Available at: <a href="http://www.ncub.co.uk/rdlandscape">http://www.ncub.co.uk/rdlandscape</a></td>
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**Learn More**


The Eight Great Technologies. Available at: https://www.gov.uk/government/publications/eight-great-technologies-infographics


Global Innovation Index - https://www.globalinnovationindex.org/content.aspx?page=data-analysis
