CHAPTER 2.0

BASELINE AND BACKGROUND

2.0 Baseline and Background

2. 1

The St Pancras site

The chosen site is in St Pancras. St Pancras is close to a cluster of health, educational and research-based organisations. These include the British Library, Cancer Research UK, MRC, Wellcome Trust and UCL. Its location next to St Pancras International and in close proximity to King's Cross and Euston stations is probably the most accessible location by public transport in Europe. It offers excellent links to the UK, Europe and all major airports in the South East. In addition there are fast rail connections to most UK cities and important centres of medical research. The local public transport connections are the best in London. This location is highlighted on the map, Figure 3.1.

2. 2

This map makes the very graphic, important point that the UKCMRI site is less that 10 minutes walk from the unique cluster of hospitals and educational institutions which are already working on some of the most important research in the medical world today.

2. 3

The close location of these other institutions is key – the best new innovations and ideas come from organisations and doctors working side by side, near one another or even in the same laboratories. This is important because doctors and scientists make their best discoveries about new treatments and cures when they are working closely together and able to make effective connections.

2. 4

Creating a single building on this site for this kind of science will be crucial because it will enable collaborative working, discussion and innovation, in a way that a collection of buildings in different locations, or indeed outside the cluster itself, cannot.

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2. 5

Planning background

Local planning background

The land bounded by Euston Road, Midland Road, Brill Place and Ossulston Street was set aside in 1975 for development of the British Library. However the northern section of this land was declared surplus to the requirements of the library and the Department for Culture Media and Sport disposed of it through the market in 2007 at which time UKCMRI acquired it.

2. 6

The site has been largely unused since the late 1960s, contributing to the relative stagnation of the local area compared to other nearby central London locations.

Regional planning background

In his Economic Development Strategy (2009), the Mayor has acknowledged the need to broaden London's economy, seeking to consolidate the city's strength in business services and finances while also encouraging some diversification in other growth sectors.[11] This, he argues, will be the most effective economic development strategy for London.

Within London the Mayor recognises the importance of innovation to the city's economy. Policy 4.10 in the Draft Replacement London Plan (2009), which is scheduled for adoption in 2011, relates to new and emerging economic sectors in London.[12] It explicitly states that the Mayor will support innovation and research, including strong promotion of London as a research location and encouraging the application of the products of research in the capital's economic development. It seeks to ensure availability of sufficient workspaces appropriate to the needs of emerging sectors and also highlights the special status of the Bloomsbury/Euston area in respect of its higher and further education institutions.

2. 7

The supporting text reiterates the Mayor's commitment to supporting biomedical research and development through the planning system including the use of planning obligations and land acquisition powers. It also seeks to ensure that innovation can be adequately accommodated within the city.

2. 8

National planning background

Planning Policy Statement 4 (PPS4, 2009) sets out the Government's national policies for economic development.[13] It strongly supports economic development and expects local planning authorities to support applications where they accord with the development plan or there is a strong evidence base in support of them.

[11] London Development Agency (LDA) The Mayor's Economic Development Strategy (October 2009) London: GLA

[12] Mayor of London (2009) The London Plan: Consultation Draft Replacement Plan 2009 London: GLA

[13] Department for Communities & Local Government (DCLG) (2009) PPS4: Planning for Sustainable Economic Planning UK: The Stationery Office

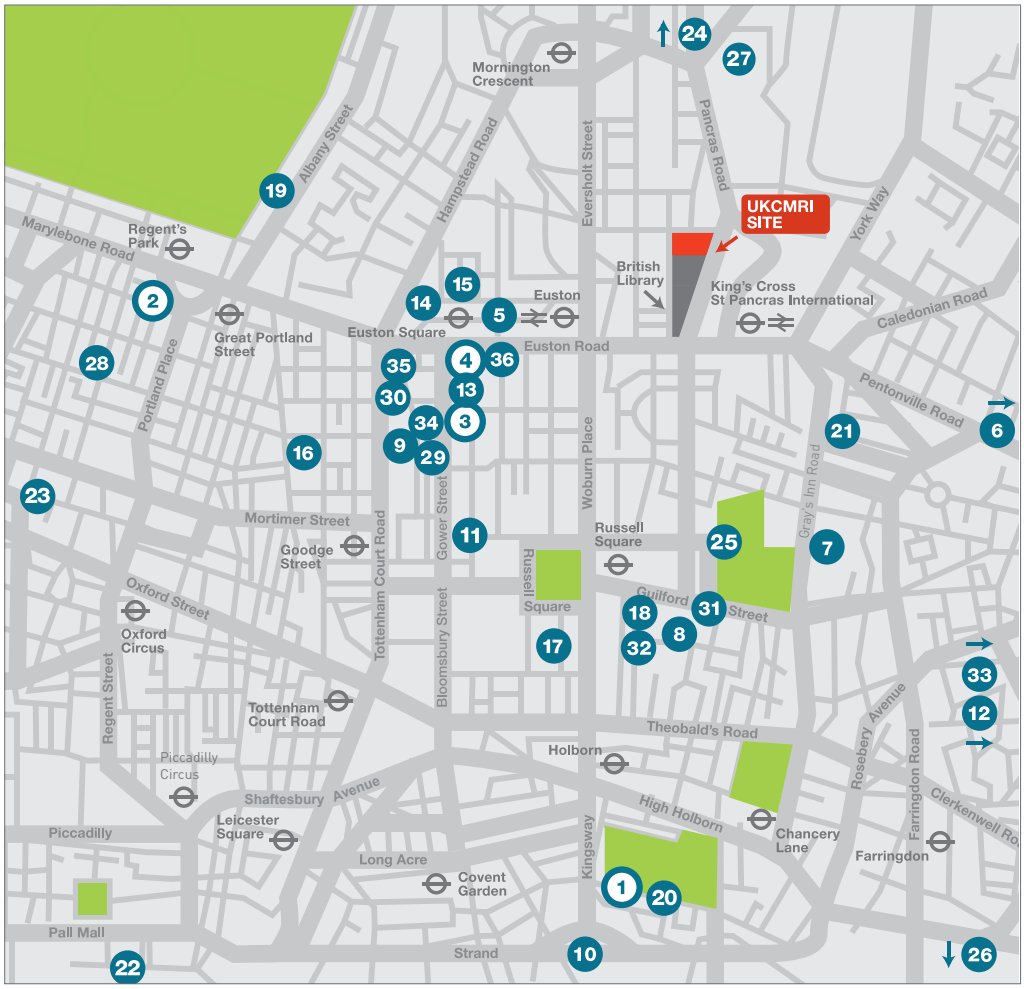

Fig 2-1. Map highlighting the proposed location of UKCMRI

1. CANCER RESEARCH UK LRI LABORATORIES
2. MRC
3. UCL MAIN CAMPUS
4. WELLCOME TRUST
5. ARTHRITIS RESEARCH CAMPAIGN
6. CANCER RESEARCH UK NEW HEAD OFFICE
7. EASTMAN DENTAL HOSPITAL
8. GREAT ORMOND STREET HOSPITAL
9. HOSPITAL FOR TROPICAL DISEASES
10. KING'S COLLEGE LONDON
11. LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE INCLUDING MRC INTERNATIONAL NUTRITION GROUP
12. MOORFIELDS EYE HOSPITAL
13. MRC CELL BIOLOGY UNIT
14. MRC CLINICAL TRIALS UNIT
15. MRC GENERAL PRACTICE RESEARCH FRAMEWORK
16. MRC/UCL CENTRE FOR MEDICAL MOLECULAR VIROLOGY
17. MRC UNIT FOR LIFELONG HEALTH AND AGEING
18. NATIONAL HOSPITAL FOR NEUROLOGY & NEUROSURGERY INCLUDING MRC CENTRE FOR NEUROMUSCULAR DISEASES
19. ROYAL COLLEGE OF PHYSICIANS
20. ROYAL COLLEGE OF SURGEONS OF ENGLAND
21. ROYAL NATIONAL ENT HOSPITAL
22. ROYAL SOCIETY
23. ROYAL SOCIETY OF MEDICINE
24. ROYAL VETERINARY COLLEGE
25. SCHOOL OF PHARMACY, UNIVERSITY OF LONDON
26. ST BARTS HOSPITAL
27. ST PANCRAS HOSPITAL
28. THE HEART HOSPITAL
29. UCL CANCER INSTITUTE
30. UCL INSTITUTE FOR WOMEN'S HEALTH
31. UCL INSTITUTE OF CHILD HEALTH INCLUDING MRC CENTRE FOR EPIDEMIOLOGY FOR CHILD HEALTH
32. UCL INSTITUTE OF NEUROLOGY INCLUDING MRC PRION UNIT
33. UCL INSTITUTE OF OPHTHALMOLOGY
34. UCL WOLFSON INSTITUTE FOR BIOMEDICAL RESEARCH
35. UNIVERSITY COLLEGE LONDON HOSPITAL
36. WELLCOME COLLECTION INCLUDING WELLCOME LIBRARY

2.0 Baseline and Background

2. 9
The UK Government (and subsequently the London Plan) supports the concept of clusters of economic activity and the benefits that they generate. The Department of Trade and Industry (subsequently BERR, then BIS) commissioned a study of clustering in the UK from Professor Porter[14] who initiated the concept. In their guidance, government points out that 'in the conclusion to his 2003 study, Porter argued that the UK economy had reached a transition point. UK companies must shift... to competition based on more distinctive and innovative products and services'.

2. 10
Furthermore Porter's assessment of UK business performance pointed to 'insufficient investment in capital assets and innovation' and 'adoption of modern management techniques was lagging' and he found that 'low investment in universities and the public research sector' was a contributory factor to this. He found that 'some new management techniques are difficult to communicate in the abstract. They are best learned through interaction with other... professionals in the same cluster or industry – processes which institutions for collaboration facilitate and support.'

2. 11
The Government has also published 'A Practical Guide to Cluster Development'[15] to assist Regional Development Agencies in developing policies in this area. This discusses Silicon Valley, USA and Cambridge, UK as examples of research institutes as key drivers of cluster development. The report also gives examples of promoting innovation through research infrastructure. It highlights the importance of linkages between local researchers and firms, and collaboration more generally, in supporting innovation.

2. 12
Socio-economic baseline
This section describes the current socio-economic conditions around the proposed site. The site is located within a cluster of health, educational and research-based organisations. Camden, and the area around the site in particular, is home to an agglomeration of business services and health activity. Workers who live in Camden are highly skilled and residents of Camden who are seeking work are noticeably doing this in more skilled occupations.

2. 13
However, Camden has challenging employment aspirations and it needs investment to catalyse demand. Around the site there is also significant deprivation, falling within the bottom 10 per cent of all areas in the UK.

[14] Porter (2003)
[15] 'A Practical Guide to Cluster Development: A Report to the Department of Trade and Industry and the English RDAs', by Ecotec Research & Consulting

2. 14

Employment

With a workforce of 290,000[16], Camden is home to the third largest cluster of employment in London, following neighbouring Westminster and the City of London. It is similar in size to the City of London, which had a workforce of 340,000 and around half the size of Westminster.

2. 15

With over 100,000 people working in Business Services in Camden, this is by far the largest sector of employment here. As the chart shows, this sector accounts for a considerably larger proportion of total Camden workers than across the rest of London. Health & Education and Other Services are also over-represented in the borough.

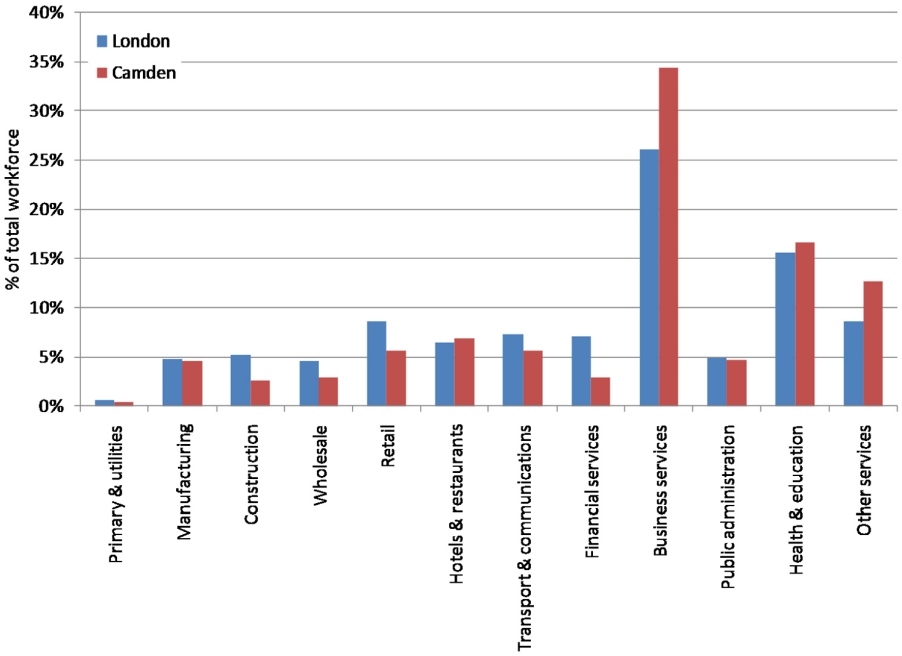

Fig 2-2. Composition of Camden workforce in comparison to London
Source: GLA Economics Annual Long-run employment EBS Dataset

[16] In 2007, from the latest GLA Economics dataset

2.0 Baseline and Background

2. 16
In fact, both with workforces of around 50,000 people, Westminster and Camden are by far the largest clusters of Health and & Education activity in the whole of London.

2. 17
Health & Education jobs tend to be correlated with population levels, as hospitals and schools must be provided in line with residential need. A useful way to identify genuine clusters in these sectors is therefore to consider the number of employees per head of population. In London there are on average 95 Health & Education jobs per 1,000 population. Camden has more than double this, with just over 210 jobs per 1,000 population. This emphasises the extent of the cluster of activity in this sector. The only other comparable boroughs are Westminster with 230 jobs per 1,000 population and Islington with 160. After this, the boroughs quickly fall away towards the average or lower[17]. This pattern of clustering of health and education employment is shown in the map below.

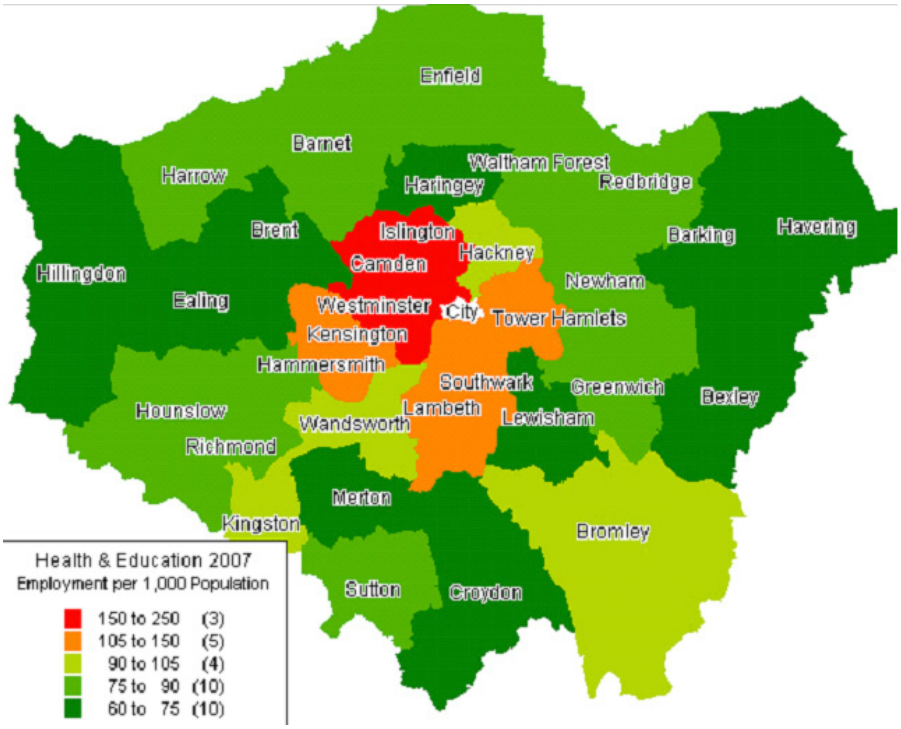

Fig 2-3. Health & Education employment per 1,000 population, 2007

[17] We have excluded the City of London from this comparison because the extremely low population numbers here (the borough has an estimated 8,000 population in 2007) make the calculations meaningless.

2. 18

The chart below shows the challenging growth projections for Camden from the current draft London Plan. London's workforce is projected to grow by 17 percent from 2007 to 2031, the equivalent of over 750,000 new jobs. Camden's workforce is projected to grow more strongly than this, at 24 percent, with over 70,000 new jobs in the borough. This means that Camden's share of London's employment is projected to rise from 6.2 percent in 2007 to 6.6 percent in 2031, with 9 percent of London's growth being planned to be located here. This identifies Camden as one of the key places required to succeed if London is to achieve its growth projections.

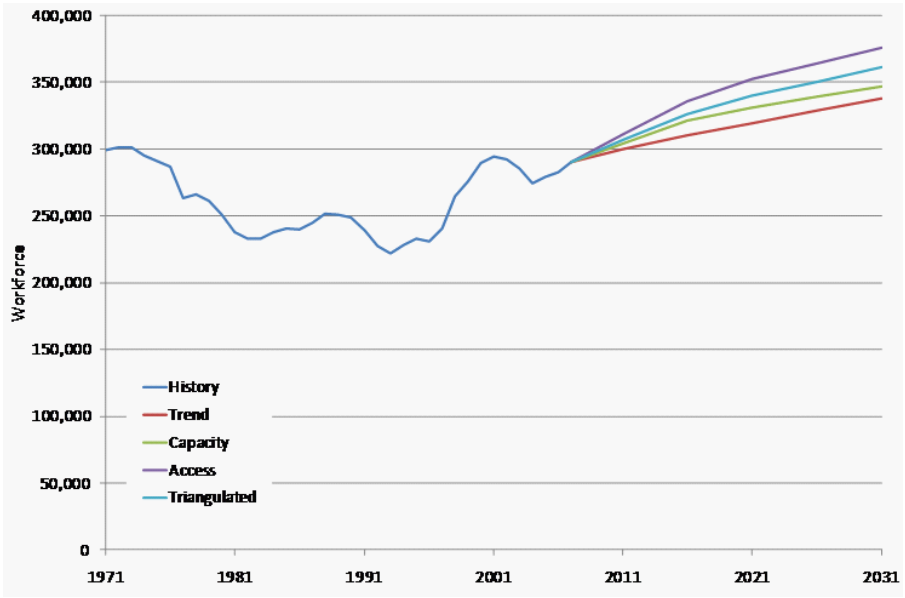

Fig 2-4. Camden workforce 1971-2007 actual and projections to 2031
Source: GLA Economics: Annual Long-run employment EBS Dataset and Triangulated projections

2.0 Baseline and Background

2. 19
The projections for Camden are shown in the chart above. The four lines show the three types of projections which are together combined to give the 'triangulated' figure. The three types of projections are based on trend (what future employment in Camden will look like if historic trends continue), capacity (how much employment available sites can accommodate) and accessibility (how many employees can get into Camden for employment). The chart shows that the lowest of the potential outlooks comes from the trend based projections, followed by the site availability but that accessibility is not a limiting factor for growth in the borough.

2. 20
The triangulated projection is higher than both the trend based projection and the site availability. This means that in order to achieve its employment aspirations, Camden requires investment of this sort to catalyse demand. The investment in UKCMRI is ideal in helping Camden to achieve its potential – it will both create demand for space, as evidenced from the investors' desire to locate here and also inject new site capacity into the borough. Against this backdrop, the investment in UKCMRI is exactly in line with the London Plan's view of growth in the capital and the potential identified for Camden.

2. 21
Skills
The chart below shows that Camden's working age population is considerably more skilled than even the London average, which is itself much more skewed towards higher qualifications than the national average. This suggests that an employment location focussed towards a highly skilled workforce is appropriate for this area.

2. 22
Similar to the qualifications of the workforce, there is an obvious trend in claimants by occupation as well. The chart below shows this, highlighting that there are higher proportions of people looking for higher occupation jobs in Camden than the rest of London which in turn is higher than the national average. Again this suggests that the proposed UKCMRI development would meet the needs of those seeking work in Camden and the wider London area.

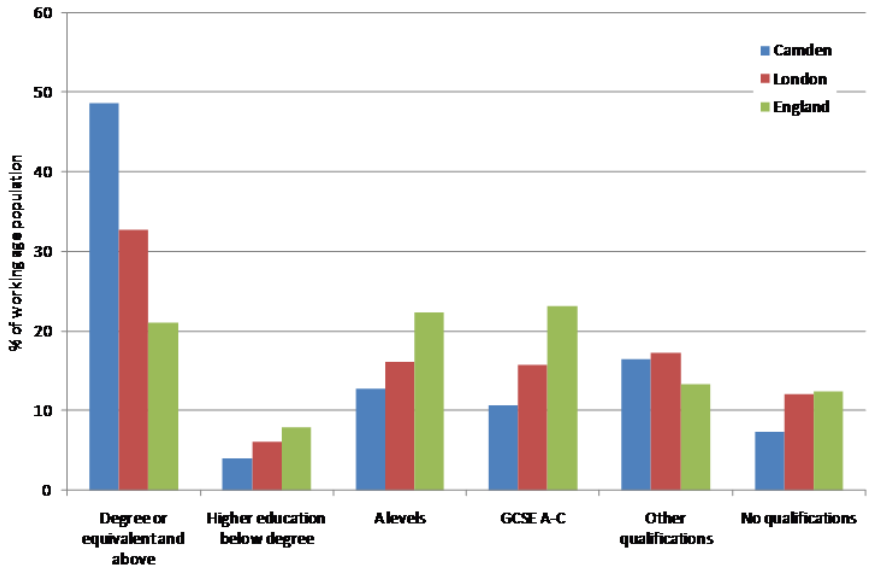

Fig 2-5. Skills in Camden, London and England, Jan-Dec 2008
Source: Annual Population Survey

2. 23
The most relevant category of those seeking work in Camden is in the 'Associate Professional and Technical Occupations' category (15 percent of job claimants in comparison to only 6 percent nationally), into which many of the employment opportunities at UKCMRI would fall. Although there are rather larger numbers of sales staff and those in elementary occupations seeking work, in both cases these are below the London average, and the unskilled are particularly less well represented.

2. 24
Deprivation
The area around the site suffers from high levels of deprivation. The Lower Super Output Area that the site falls in is in the bottom 10% of UK areas on the overall Index of Multiple Deprivation. The map below shows the overall IMD with Kings Cross St Pancras station highlighted to identify the location.

2. 25
The IMD is an overall indicator of deprivation based upon seven underlying domains in the areas of income; employment; health deprivation & disability; education, skills & training; barriers to housing & services; crime; and living environment.

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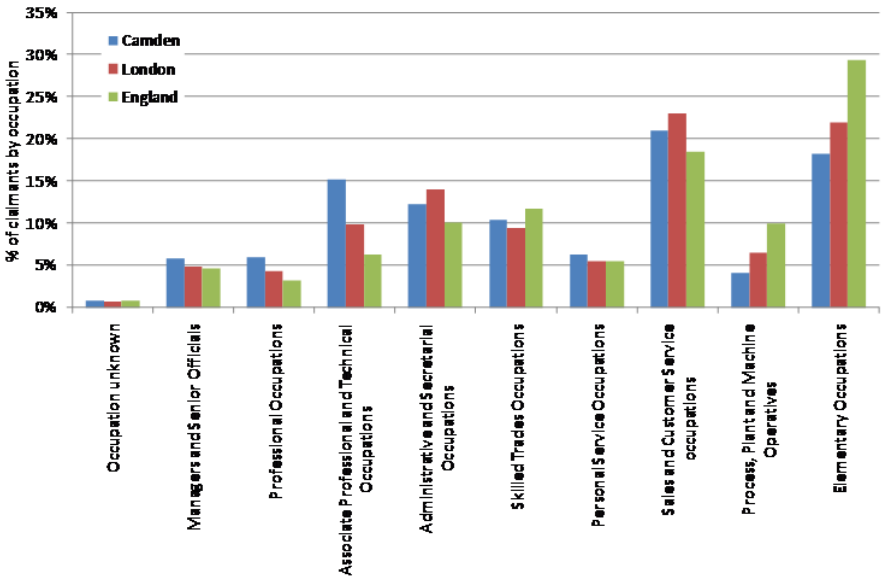

Fig 2-6. Claimants by Occupation in Camden, London and England, June 2010
Source: Claimant Count, from NOMIS

2. 26
Across these different measures of deprivation the site is in the bottom 6% of all UK areas for Health & Income; bottom 12% for Employment & Living Environment; bottom 20% for Crime; bottom 30% for Barriers to Housing & Services; and bottom 40% for Skills.

2. 27
The Health indicator combines four indicators on disability, emergency admissions, anxiety related disorders and years of potential life lost.

2. 28
The Income indicator combines various statistics on unemployment – relating to income support, job seekers allowance, pension credit, working and child tax credits and national asylum support vouchers.

2. 29
These characteristics show that the site is in an area in need of regeneration and renewal. Residents currently have poor health outcomes, high dependency on benefits, a poor living environment and significant incidence of crime.

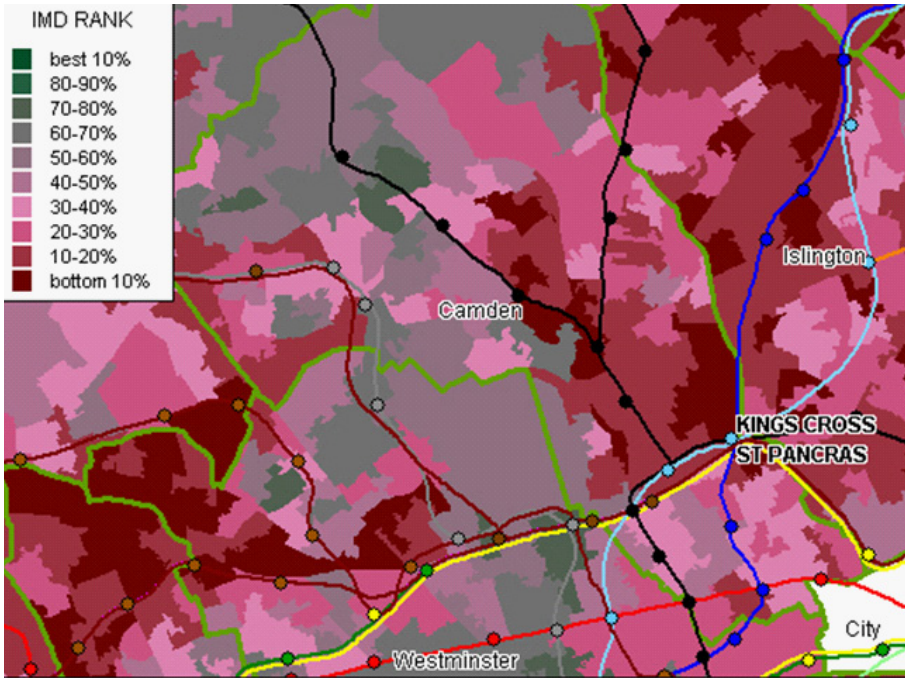

Fig 2-7. Index and Multiple Deprivation around the site
Source: CLG IMD data, by LSOA

2. 30

Medical research background

This section looks at the role of medical research and why it is important to the UK economy. This rests on the role of innovation in maintaining the UK's economic performance. Innovation is one of the main drivers of economic growth. Furthermore it allows the economy to move into new and higher value added activities with associated income levels. Lying behind innovation is the need to invest in the knowledge creation process.

2. 31

The UK is still one of the leading scientific nations but it is not capitalising on its strengths and risks losing its competitive edge and being irreversibly overtaken by the USA and emerging economies. The case studies in Appendix B describe the relative positions of emerging economies and up and coming European countries which are challenging the UK; as well as a case study of the world leader, the US.

2. 32

Supporting developments such as UKCMRI is therefore crucial to increasing UK economic growth and maintaining global competitiveness.

2.0 Baseline and Background

2. 33

Transformation of the UK to knowledge economy

Since the 1970s the economies in many developed countries have shifted away from a predominantly manufacturing base towards one that is dominated by services[18]. This has meant an increasing reliance on intellectual capabilities rather than physical input or natural resources and is reflected in the growing production of intangible information or knowledge-intensive services[19]. In the UK knowledge-intensive services now account for three quarters of Gross Value Added (GVA) and Gross Domestic Product (GDP) and over 80% of employment[20].

2. 34

Although 'services' covers a range of activities, including financial and business services, healthcare, retail and the creative industries, science underpins much of this economic restructuring. As such the 'public science base', which is defined as science, technology, engineering and mathematics ('STEM'), is essential to ongoing innovation within the economy's knowledge-intensive service sector. Such is the significance of this that The Royal Society refers to the twenty first century as the 'scientific century'[21].

2. 35

Given the significance being attached to science and innovation in today's 'scientific century', it is perhaps unsurprising that, following the recent recession, many governments around the world are targeting science and innovation as part of their economic stimulus packages.

2. 36

US President Barack Obama, for instance, made "the largest commitment to scientific research and innovation in American history" on the grounds that "science is more essential for our prosperity, our health, our environment, and our quality of life than it has ever been before"[22].

2. 37

Similarly, in 2010 French President Nicolas Sarkozy approved his country's €20 billion 'big loan' to boost research, education and innovation with at least €5.5 billion of this specifically for life sciences, biotech, clean-tech and academic research[23].

[18] First described as the knowledge economy in Drucker, P. (1969). The Age of Discontinuity; Guidelines to Our changing Society. New York: Harper and Row

[19] Powell, W. And Snellman, K. (2004) 'The Knowledge Economy' Annual Review of Sociology, Vol 30 pp199-220; Daniels, O. And Bryson, J. (2002) 'Manufacturing Services and Servicing Manufacturing to Knowledge-Based Cities and Changing Forms of Production' Urban Studies Vol 39:5-6 pp977-991

[20] The Royal Society (2009) Hidden Wealth: The Contribution of Science to Service Sector Innovation Also, The Royal Society (2010) The Scientific Century: Securing our Future Prosperity

[21] The Royal Society (2010) The Scientific Century: Securing our Future Prosperity

2. 38
The table below lists some of the recently announced economic stimuli through R&D from countries around the world.

2. 39
Although the UK's 2008 economic stimulus package did not specifically invest in science and research, the then Prime Minister Gordon Brown emphasised his Government's commitment to science and research, particularly in the current economic climate. During the Romanes Lecture in Oxford in 2009 he declared that "…we look to science to provide new solutions, new technologies, [and] new opportunities to further our common goals.[24]" Labour had also pledged around £15bn of public money to medical research during the next ten years and, under Brown's leadership, the Department for Business, Innovation and Skills (BIS) committed £250m towards funding for UKCMRI[25].

COUNTRY	ECONOMIC STIMULI THROUGH R&D*
USA	Doubling basic science spend 2006-2016 plus $21bn increase in R&D
	Committed $10.4bn additional funding for medical research to the US National Institutes as part of its recent fiscal stimulus
China	$860m R&D investment to help Chinese companies
	Increased R&D funding by over 20% year-on-year between 1999 and 2005
Canada	$6bn for R&D including funding to temporarily expand graduate student programmes
Germany	€900m for collaborative R&D in SMEs
France	€730m boost for HE and research, more generous R&D tax credits estimated to create 25,000 research jobs in medium term €20bn 'big loan' for research, education and innovation
	Announced a $50.5bn package to boost the country's economic competitiveness that included around $11.5bn for research and around $15.9bn for higher education
Spain	2009 budget for R&D increasing 6.7% plus €500m for specific initiatives
Australia	$580m fast-tracked into universities
Austria	€100m for R&D, €120m for university infrastructure

Fig 2-8. Recently announced economic stimuli through R&D around the world
Source: Council for Science and Technology 2010: 15

[22] Obama, B. (2009) Speech by US President Barack Obama at the 146th Annual Meeting of the US National Academy of Science cited in The Royal Society (2010)
[23] Enserink, M. (2009) 'Research set to win big in France's stimulus plan' ScienceInsider 20th November; Pahlavan, G. (2010) 'Sarkozy's great biotech loan' Nature Biotechnology
[24] Brown, G. (2010) 'Romanes Lecture' In: Sheldonian Theatre, University of Oxford 27th February
[25] Brown, G. (2010) 'Going for Growth' In: The Department for Business, Innovation and Skills 7th January; Medical Research Council (2010) '£250 million MRC commitment to world-leading UK laboratory' 25th March

2.0 Baseline and Background

2. 40
The new Coalition Government similarly recognises the importance of science, technology and research to the UK's economic well-being. In October 2009 David Cameron asked Sir James Dyson to look at how to stimulate science and engineering to generate wealth in the UK reflecting the now Prime Minister's ambition for the country to become Europe's leading generator of new technology[26]. The new Government has also committed to providing its share of funding (£250m) for UKCMRI over the next five years, subject to ministers receiving a satisfactory business case.

2. 41
As elsewhere in the world, the UK's Government is keenly aware that excellence in science is a prerequisite for future economic success. The latest report from BIS[27] recognises that "The economic impact of science and research is essential for capturing a significant share of high value activity in large global markets". It also says that "Innovation policy will focus on realising the benefits that better links between universities, enterprise, skills and access to finance will bring".

2. 42
Innovation, Knowledge Production and Clusters
Such future success rests on the application of science to the innovation process. Government and economic analysis have identified five drivers of economic growth: investment, innovation, skills, enterprise and competition[28]. Maintaining progress on these has been a major driver of policy but it is also key to maintaining the UK's global position and its capacity to create jobs, pay good salaries, and generate tax revenues. Within this group, innovation has been identified as the element which allows the economy to move into new and higher value added activities. As David Audretsch[29] puts it, "Globalisation and the telecommunications revolution have rendered the comparative advantage in traditional moderate technology industries incompatible with high wage levels. At the same time, the emerging comparative advantage that is compatible with high wage levels is based on innovative activity."

2. 43
Lying behind innovation and indeed investment is the knowledge creation process. All economies are based on a set of ideas and knowledge of how to apply them. An innovative economy needs to stay ahead by continuously creating new knowledge. Such new knowledge needs in turn to be embedded in new products and services, new investments and new skills and enterprises.

[28] H M TREASURY (2000) Productivity in the UK: 1 The Evidence and the Government's Approach, HMSO, London
[29] David B Audretsch, 1998 "Agglomeration and the Location of Innovative Activity", Oxford Review of Economic Policy, Vol 14, no 2, OUP

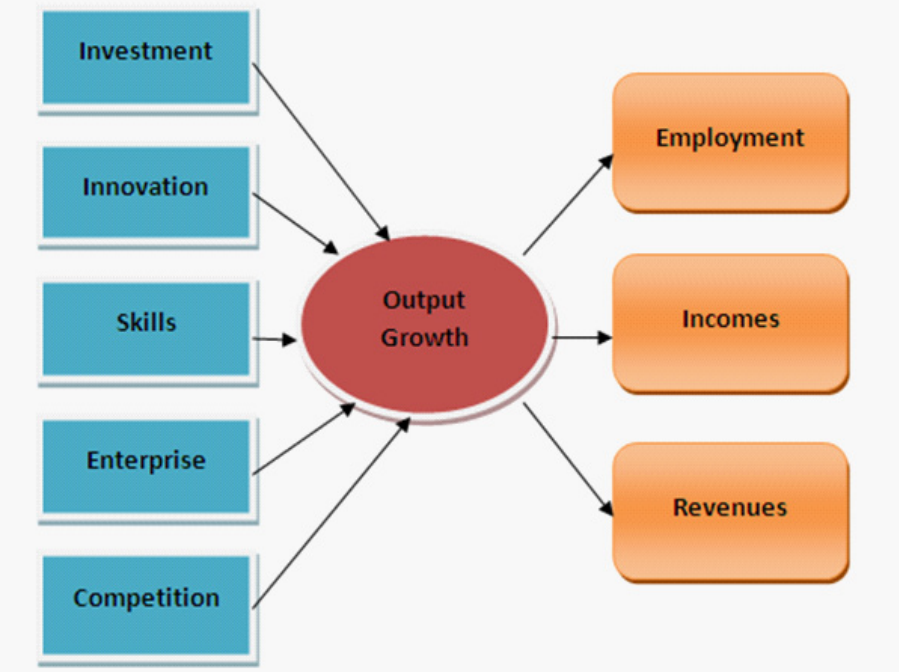

Fig 2-9. The drivers of economic growth

2. 44
The knowledge production function itself depends on previous knowledge production – the more researchers you have, the more researchers are effective[30] and the research infrastructure and institutions that enable them to come together. This means that the existence of clusters and the co-location of activity is crucial to success.

2. 45
While the evidence shows that knowledge production requires a critical mass of researchers, innovation also thrives on interconnections and difference. Work done by Volterra as part of the Manchester Independent Economic Review[31] showed that the diffusion of innovation was most effective across sectors and up and down the supply chain. The process of innovation and investment thus requires a number of linkages which are most effectively supplied in a dense and growing large city.

[30] Yasser Abdih and Frederick Joutz, 2005 "Relating the Knowledge Production Function to Total Factor Productivity: and Endogenous Growth Puzzle", IMF Working Paper, 05/75
[31] Manchester Independent Economic Review (MIER), Innovation, Trade and Connectivity, April 2009

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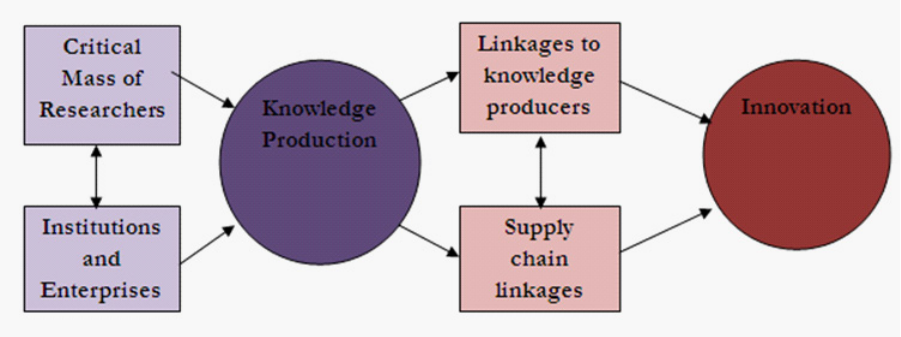

Fig 2-10. Innovation and Knowledge Production

2. 46
The final ingredient in the production of an innovative economy is geography. The development of faster and smarter communications technologies led many commentators to declare the 'death of distance'. In fact this is not what has happened. Globally for the first time in history half the population now lives in cities. And leading cities appear to have pulled ahead as the knowledge race intensifies.

2. 47
A number of authors[32] have focused on the role of the difference between transmitting information and transmitting and developing knowledge. They conclude that the right locality matters, especially for tacit knowledge. Authors such as Krugman, Venables and Fujita[33] have applied modern economic techniques to these ideas and shown how firms would be encouraged to reduce costs and exploit economies of scale and external economies by such co-location.

2. 48
With this is mind, Feldman and Audretsch use the United States Small Business Administration's Innovation Database (SBIDB) to directly measure innovative product output. This records new product announcements from over 100 technology, engineering and trade journals spanning every industry in manufacturing. The breadth of data is therefore considerable.

2. 49
They conclude that the distribution of innovation within science-based clusters and cities appears to reflect the existence of science-related expertise. Within the biomedical group, for example, Boston, a world-renowned hub of scientific excellence, featured within the top four innovative cities across the United States.[34] This would suggest that clustering positively impacts intellectual property output.

[32] Glaeser et al 1992, Growth of Cities, Journal of Political Economy 100, 1126-1152
[33] Fujita, Krugman and Venables, 1999, The Spatial Economy, MIT, Cambridge Mass; Fujita and Thisse, 2002, Economics of Agglomeration, Cambridge England
[34] Feldman and Audretsch (1998), Innovation in cities: Science-based diversity, specialisation and localised competition

2. 50
The spillover effects of knowledge transmission are not captured by standard cost based analysis. The ability easily to access experts or to bump into just the right person is not something that figures in any costings. As HERG et al point out, existing literature is unclear as to quite how this competitive advantage occurs but nevertheless shows that it does indeed happen.[35]

2. 51
Various authors have estimated these effects. On the one hand public R&D improves the productivity of existing private R&D, which in turn results in improved firm performance. Jaffe (1989) showed, for example, that public research indirectly affects private patents by increasing private R&D. Using a 'knowledge production function' he calculated that the overall elasticity of private (or corporate) patents relating to university R&D is around 0.1, meaning that a 1% increase in university R&D is associated with a 0.1% increase in private patents.[36] Together with models of industry R&D and university research which found a even larger associated effect, Jaffe found that the implied elasticity of induced private patents related to university research was almost 0.6.[37]

2. 52
Other studies corroborate Jaffe's findings. Acs et al (1992), for example, analysed actual product innovations in the United States and found even higher elasticities and stronger support for co-location.[38]

2. 53
On the other hand public research can improve firms' performance via a more direct impact on their productivity (i.e. other than impacting existing R&D). Arundel and Geuna (2001), for example, tested the importance of proximity to the transfer of knowledge from publicly funded research organisations (PROs), including universities, to Europe's largest industrial firms. They found that PROs are the most important external source of knowledge for firms' innovation, either through personal contacts, joint research and/or hiring scientists and engineers.[39]

2. 54
The role of London and scientific research
The research shows that clustering of scientific activity improves its effectiveness both directly in research terms and also indirectly in generating innovation in firms. More generally, it can be shown that as business clusters grow they become still more effective. This is the process of agglomeration, a dynamic process which creates feedback loops which can switch locations onto a different path. Once established, a focus of agglomeration is an important asset which should not be undervalued. Central London is such a location, whose effectiveness also depends on its scale.

[35] HERG et al (2008), Medical Research: What's it worth? Estimating the economic benefits from medical research in the UK
[36] Jaffe, A. (1989) 'Real effects of academic research' American Economic Review Vol.79(5) pp957-970 cited in HERG et al (2008)
[37] Jaffe, A. (1989b) cited in HERG et al (2008)
[38] cited in HERG et al (2008)
[39] Arundel, A. and Geuna, A. (2001) 'Does proximity matter for knowledge transfer from public institutes and universities to firms?' SEWP 73 cited in HERG et al (2008)

2.0 Baseline and Background

2. 55
For example, work done on the Case for Crossrail[40] showed that the ability to increase activity in central London area would raise UK productivity. Taking a long term perspective of these benefits suggests that the total benefit could be as much as £70bn (NPV) against cash costs of £16bn. A similar analysis applies to the St Pancras area which is inside the central area. A government analysis showed the sub-specialisms within this area.

2. 56
These estimates were applied to central London to which Crossrail delivered. Within this area there are a number of more distinct areas, in which particular specialisms operate, while still being able to access a wide variety of other experts.

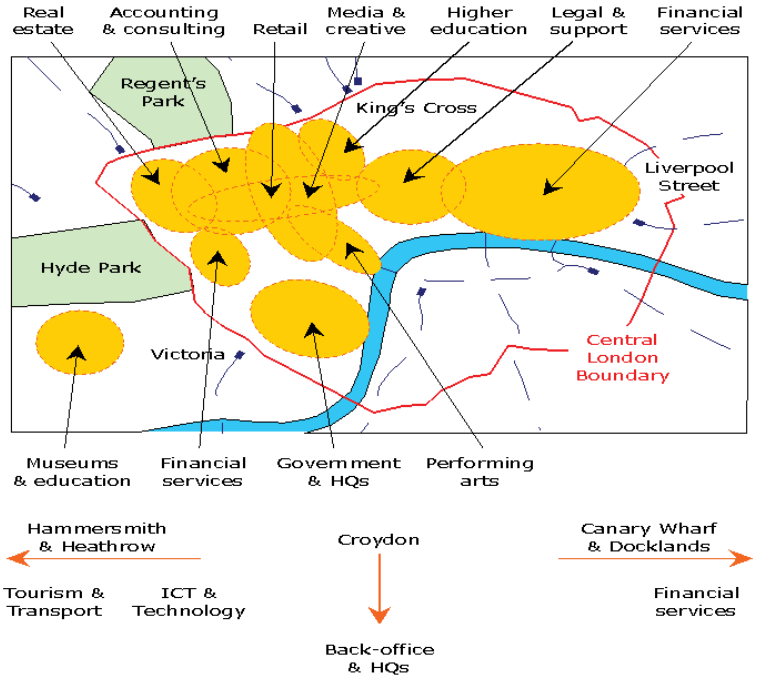

Fig 2-11. Clusters of activity in London
Source: Cabinet Office Strategy Unit 2004

[40] Colin Buchanan Limited and Volterra Consulting, 2007 The Economic Benefits of Crossrail, Case for Crossrail

2. 57
The map illustrates some of these particular areas, although of course they continue to develop and change. For example a new legal and consultancy cluster has emerged on the South bank of the Thames as its connectivity has improved.

2. 58
The higher education centres are, however, long established, with institutions such as UCL, LSE, Imperial, and Kings College as leading UK centres of excellence and creating their own areas of specialism – of which medicine is a notable example – across a variety of disciplines. However, innovation also requires the addition of other attributes, as we have seen. These also need to be nearby and readily accessible. A research institute in a wilderness will be much less able to produce innovation and economic growth than one located in a centre of other activities.

2. 59
Thus the strength of London's existing R&D attributes mean that it will be able to capitalise on new investment in a way which will not occur elsewhere. It is a world-class city and the mainstay for head offices across all sectors of the economy. Its population is highly skilled and it is home to five world-class medical schools, 55 hospitals and several top-ranked universities and research institutes. It has the biggest concentration of higher education facilities in Europe, including two of the world's top-ten ranking universities[41]: UCL and Imperial College London. These two London-based universities also rank within the world's top 25 universities for life sciences and biomedicine.

2. 60
Countless scientific networks operate within the city and, in part through the support of the London Development Agency, the city has actively sought to improve incubator facilities for biotechs. It is also a focal point for medical expertise within the NHS providing the infrastructure to roll out practical applications designed to improve people's health and well-being.

[41] Times High Educational Supplement (THES) 2009: Cambridge, UCL, Imperial and Oxford are ranked 2nd, 4th and joint 5th respectively.

2.0 Baseline and Background

2. 61
These scientific networks include:

1. Collaboration between University College Hospital (UCH), Cancer Research UK and UCL Cancer Trials Centre (CTC), the latter of which is one of only nine cancer trial units accredited by the National Cancer Research Institute;[42]
2. Three of the UK's five Academic Health Sciences Centres (AHSCs), involving Imperial College London and Imperial College Healthcare NHS Trust, UCL Partners and King's Health Partners respectively;[43]
3. The London Biotechnology Network which seeks to provide its 800 plus member-organisations with networking opportunities for innovation and collaboration in the Life Sciences; [44]
4. Three of the National Institute for Health Research's five Comprehensive Biomedical Research Centres (BRCs), partnerships between an NHS organisation and university, as well as four of its seven Specialist Biomedical Research Centres;[45]
5. The world's largest liquid chromatography and extraction instrument at Brunel's Institute for Bioengineering, which regularly attracts researchers from China;[46]
5. One of the largest concentrations of state-of-the-art imaging equipment in Europe at Imperial College London;[47]
7. The LDA funds and supports Catalyst which brings together industry, ~ academia, finance and the public sector specifically to champion London's strengths in science, technology and design.[48]

2. 62
Locating UKCMRI in Central London will therefore enable it to benefit from and enhance all that the capital already has to offer in relation to both R&D and as a world-class city. Specifically, it will be situated within Camden's existing R&D cluster and within easy walking distance of a plethora of hospitals, educational institutions and learned societies currently working in medical research. This combination of factors offers the best potential for beneficial spinoffs to occur.

2. 63
At least 50 biotech pharmaceutical companies have already been spun out from London's universities and efforts are being made to make the capital more attractive to venture capitalists.[49] The Wellcome Trust's Technology Transfer funding programme, for example, seeks to bridge the gap between basic research and commercial application by funding applied research and development projects to a stage which makes them attractive to follow-on funders such as venture capital firms.[50]

[42] Ibid.
[43] Ibid.
[44] London Biotechnology Network (2008c) BioGuide London: Oncology Report 2008 available at http://www.londonbiotechnology.co.uk/Events-and-publications/Publications/Oncology-Book---FINAL.aspx [accessed 25th May 2010]

[45] London Biotechnology Network (2008b)
[46] London Biotechnology Network (2008d) 'Services/Specialist equipment' London BioGuide http://www.londonbiotechnology.co.uk/London-BioGuide/Facilities-and-services/Specialist-services--equipment.aspx?id=200&p=0 [accessed 25th May 2010]

[47] Ibid.
[48] LDA (n.d.(c)) 'Encouraging Business- Science & Technology- Catalyst' London Development Agency

2. 64
Taking an American example, as of 2003, there were fourteen companies in the Boston metropolitan area created in-part or in-whole on technology licensed from Harvard University.[51] Half of these companies were under five years old.[52] Harvard faculty members have also created companies, some of which like Wyeth Genetics Institute and Cambridge Energy Research Associates have subsequently become major regional employers.[53] And Harvard graduates have also established new companies, including Forrester Research, Aquent and Vertex Pharmaceuticals.[54] This ongoing creation of new businesses has been a critical part of the ongoing development of the Boston area economy.[55]

2. 65
Entrepreneurialism thus provides the momentum for existing R&D clusters to grow, creating jobs and boosting economies. This is an example of what has been dubbed Triple Helix III by Etzkovitz and Ranga[56], in which this is defined as a balanced model of interdependent spheres. The authors point out that it takes decades to build such systems and that they require continuous reinvestment.

2. 66
CBRE Research found that pharmaceutical companies generally favour established, successful R&D clusters that have, amongst other things, a skilled workforce, established science networks, and opportunities for collaboration with academic/institutional research entities. The location of UKCMRI will enable it to maximise these opportunities for spinoffs into other investments.

Reinforcing the UK as a world leader in Scientific Research
The UK is currently one of the world's leading scientific nations.
- It generates over 10% of world's clinical science and health research
- It created nearly a quarter of the world's top 100 medicines
- Its home to more than 30 Nobel Prize winners for biomedical research
- It employs 25% of Europe's medical biotech employees
- Its medical biotech leads Europe in the number of drugs at all stages of clinical development
- It is the most scientific publication productive country (eg citations per research)
- It produces more citations and publications per £ spent on science and technology than any other G8 country
- It has the highest share of public biotech companies in Europe
- It is home to two of the world's largest pharmaceutical companies (GlaxoSmithKline and AstraZeneca)

[49] London Biotechnology Network (2008e) 'Universties/Research Institutes and Spin-Out Companies' http://www.londonbiotechnology.co.uk/London-BioGuide/Academia-technology-knowledge-transfer/Universities--research-institutes-and-spin-out-com.aspx [accessed 27th May 2010]

[50] The Wellcome Trust (n.d.) 'Technology Transfer' http://www.wellcome.ac.uk/Funding/Technology-transfer/index.htm [accessed 27th May 2010]

[51] Appleseed Inc for Harvard University (2004) Innovation and Opportunity: Harvard University's Impact on the Boston Area Economy

[52] Appelseed Inc for Harvard University (2004)
[53] Appelseed Inc for Harvard University (2004)
[54] Appelseed Inc for Harvard University (2004)
[55] Appelseed Inc for Harvard University (2004)
[56] Henry Etzkowitz and Marina Ranga, (2010) Triple Helix System for Knowledge-based Regional Development: From "Spheres" to "Spaces".

2.0 Baseline and Background

- UK-based companies lead Europe's pipeline in pharmaceutical products, accounting for more than 20% of products in clinical development
- It houses four of the world's top 30 ranking universities (Oxford, Cambridge, UCL and Imperial) according to Shanghai's Jiao Tong 2009 ranking.[57] These are 4 of only 8 non-US universities featured.
- It houses four of world's top 10 ranking universities in the Times High Educational Supplement (THES) 2009.[58] Moreover THES ranks the same four as being within the top 25 for life sciences and biomedicine.
- It houses 15% of all international doctoral students study in the UK
- High tech clusters of excellence have developed not only in London but also across the country in Oxford, Cambridge, Surrey, Southampton, Manchester and York.

2. 67
However, while the UK is currently one of the world's leading scientific nations, many warn that it is not capitalising on its scientific strengths and risks losing its competitive edge.

2. 68
Scientific leadership shifted from Europe to the USA during the twentieth century. Arguably it is now shifting again, towards newly emerging economies such as China, India and Brazil.

For example:
- Latest figures on patents, prizes, papers and citations tend to be a little out of date. Some studies estimate that China has already overtaken the UK in terms of scientific publication production.
- Whilst it continues to lead Europe, this lead has dropped off. Whereas in 2006 it accounted for 35% of all products in development (and 41% of all Phase III products), this has dropped to 20% (and 23% respectively) by 2009.
- Between 2000 and 2006 the proportion of the world's clinical trials conducted in the UK fell from 6% to 2%.
- Expenditure on R&D research in the UK is considerably lower than some other countries. For example in 2005 American companies spent 1.9% of GDP, and this figure was 1.8% in Germany. In comparison, UK companies spent only 1.2%.
- While it is widely agreed that the NHS is a significant resource in the UK, many also consider it under used and not meeting its research potential as it is failing to translate clinical research into practise.
- The number of UK science-based doctorates has fallen from 65% of the total awarded to 57%.

[57] Shanghai Jiaotong Academic Ranking of World Universities 2009: Cambridge (4th), Oxford (10th), UCL (21st), Imperial (26th)
[58] Times High Educational Supplement (THES) World University Rankings 2009: Cambridge, UCL, Imperial and Oxford are ranked 2nd, 4th and joint 5th respectively.

2. 69
Despite this the UK continues to be a global player and is considered to be Europe's leading biotechnology economy and second only to the USA in research output relating to the life sciences.

2. 70
In recent years, however, a number of global hubs of scientific excellence have emerged not only in the USA but also within Asia and other parts of Europe. This has left the UK vulnerable to competition in terms of both capital and labour and has serious implications for its future ability to participate in science and innovation. This in turn has serious implications for the future strength of the UK's knowledge-based service economy. Some case studies for key countries are presented in Appendix B.

2. 71
Although steps are being taken to actively encourage R&D investment and growth in the UK, when contrasting it to other existing and emerging global hubs of scientific excellence it is apparent that it lacks comparable, modern R&D facilities that are specifically designed to encourage and employ the critical mass needed for collaborative, inter-disciplinary transnational research.

2. 72
As the Cooksey review[59] found, the UK is well placed given its world class health sciences base, a unified health system (the NHS), and a good pharmaceutical industry and finance sector. However, whilst good at discovery, the UK is failing to exploit this due to barriers between research and clinical practise. The Cooksey review calls for cultural change to address these barriers. UKCMRI seeks to remove exactly these barriers by creating a unique multidisciplinary research institute.

2. 73
UKCMRI will train the next generation of scientists at all levels including undergraduates, PhD students and postdoctoral fellows, as well as offering summer student programmes. It will promote transfers of its scientists with those in other UK institutions and across the world, with a view to furthering the dissemination of research and innovation.

2. 74
With this innovative approach to breaking down the barriers within medical research, UKCMRI's objective is to reinforce London's position as a global scientific centre for the 21st century, it will enable biomedical research at the highest level, and it will ensure that Camden, London and the UK are at the heart of innovation.

[59] A review of UK health research funding, Sir David Cooksey, December 2006

2.0 Baseline and Background

2. 75
Innovation is one of the main drivers of economic growth. Furthermore it allows the economy to move into new and higher value added activities. Lying behind innovation is the need to invest in the knowledge creation process. The UK is still one of the leading scientific nations but it is not capitalising on its strengths and it risks losing its competitive edge and being overtaken by emerging economies.

2. 76
This section has shown that the UK needs to maintain its strength in biomedical research if it is to retain its status as one of the largest economies in the world and support the incomes that this makes possible. Research is a key building block in the knowledge creation process which makes possible the innovation which supports growth. UKCMRI will, by virtue of its facilities and interdisciplinary mode of operation, be a world leading research institute.

2. 77
Not only does this support the growth of the knowledge economy and high tech employment in its own right. This will also continue to diversify London's economy, which is one of the strategic objectives of the London Plan.