New Anglia LEP - South Norfolk Council
Report and advice on proposed new building on Zone 4, Norwich Research Park
March 2018

PUBLIC COPY – MAY BE FREELY DISTRIBUTED BUT SHOULD BE CREDITED IN FULL IF CITED

Author – John Sommerville for Creative Places
Title – Report and advice on proposed new building on Zone 4, Norwich Research Park for New Anglia LEP and South Norfolk Council (edited version)
Public copy publication date – November 2018

This version excludes commercially sensitive information present in the original
# Table of Contents

Executive summary .............................................................................................................. 3

1 Instructions ...................................................................................................................... 5

2 Norwich Research Park ................................................................................................. 6

3 Existing demand and supply across NRP ...................................................................... 10

4 Trends likely to influence demand ................................................................................ 15

5 NRP Stakeholder engagement ....................................................................................... 22

6 Experience from relevant projects across the UK ......................................................... 23

7 Form of the Proposed Building ...................................................................................... 26

8 Viability Assessment ....................................................................................................... 27

9 Risk Assessment ............................................................................................................ 27

10 Recommendations and Next Steps .............................................................................. 29

Appendix 1 Schedule of commercial accommodation at NRP

Appendix 2 R&D Trends

Appendix 3 List of Interviewees

Appendix 4 Development Appraisals
Executive summary

This report informs South Norfolk Council’s (SNC) and the New Anglia Local Enterprise Partnership (NALEP) requirement for the potential demand for, viability and form of a new building in Zone 4 of the Norwich Research Park.

Current development, demand and supply

Norwich Research Park (NRP) is home to a number of world-class research institutions and a growing commercial R&D cluster. Across the NRP 10,050 sq m (108,182 sq ft) lettable area has been delivered for occupation by third parties either in new or re-purposed buildings, alongside major developments occupied by UEA, NNUH, the John Innes Centre and the Earlham Institute. 64 organisations currently lease physical space and there are a further 39 virtual tenants who pay to use the NRP address and/or hot desk space.

Current availability is limited, particularly for R&D office space (expected to be exhausted within the next 12 months), a situation that is mirrored by the picture for general office supply across Norwich, where current availability of good quality ‘Grade A’ space is only 1.2% of total supply, or 5,907 sq m (63,582 sq ft).

Trends influencing future demand

Demand for space from R&D businesses is being influenced by a number of trends:

- **Open Innovation** increases the pace and efficiency of R&D through co-location with business and academia.
- **Diversification** – novel uses for technology and branch out into new sectors, often in partnership with others.
- **Patient engagement and outcomes-focused product and service development** – an increasing need to ensure personalised treatments and therapies.
- **Urbanisation** – locations offering good transport connectivity and amenities.
- **Importance of Digital** – digital technology is used across a wider range of sectors, driving the need for R&D office space with good ICT connectivity.
- **Outsourcing** elements of the R&D process to lower cost centres.
- **Productivity Gap** – R&D productivity remains relatively low; in part due to the high number of SMEs developing technology with early stage funding but yet to generate sales.

These trends should increase demand for floorspace at NRP if the added value is evident. Feedback from NRP stakeholders reinforces this view. Many are engaging with industry and research organisations to develop knowledge transfer. This should increase when the Quadram Institute Bioscience building opens.

Other places have shown the wisdom of anticipating demand - whether by facilitating industry/academic collaborations (Oxford Bioescalator), growing research activity alongside industry (Edinburgh Bioquarter), enabling commercial activity growth (Oxford Begbroke Science Park) or in growing activity in the area of food and health (Wageningen in Holland).

Advice and Recommendations

We advise that:

- there is a **real need for new investment** in real estate at NRP to ensure continued growth in research, development and commerce
supply is becoming very limited on the NRP, particularly R&D office space, and will likely be exhausted within 12 months.

new space is unlikely to be delivered by private sector real estate developers/investors – it’s not commercially viable for their purposes. Investment by the LEP will be needed to maintain growth.

development on Zone 4 will increase activity in this location and encourage businesses to locate there, delivering further return on investment.

demand will currently be greatest for a building that provides R&D office space, which should be designed so that it is capable of being fitted out in part as dry laboratory space, through the provision of additional slab to slab height and glazed loading doors at ground floor.

A two-storey building of c. **1,800 to 2,300 sq m (20,000 to 25,000 sq ft)** GIA should be possible, which will require a site of c. 0.4 ha (1 acre). This assumes car parking is delivered off-plot, in the main, at NRP ratios (the established policy is that 40% of permitted car parking per development is on-plot and the remaining 60% off-plot on the developer’s car parks – which will be chargeable to users). A building of this size might be expected to deliver c. 1,580-1950 sq m (17,000-21,000 sq ft) of net lettable space and we would estimate it might then house **150-200 people**.

A building of this nature will take 15-18 months to build following a period of design and planning – at least 2 years overall. During the design and planning stage discussions should be held with potential occupiers to secure an agreed level of pre-lets to manage risk. Depending on the level of pre-letting required by NALEP/SNC we are confident the building will be let within 12 to 24 months following practical completion – with rent free periods of 6-9 months assumed given the likely lease terms. Given the expected build costs, rents and investment yields, the building may not be worth on completion and letting what it has cost to build. This viability challenge is common to the Norwich market. In the absence of this investment, there is a significant risk that NRP not be able to accommodate tenant needs.

We recommend that work is put in hand to:

- **consider the best location for the building** - a site in the far SW corner of Zone 4 has been identified. This would be sub-optimal for R&D businesses, being some distance from other relevant activity possibly for several years. It could affect take up rates and rents achievable/value. A location closer to NNUH, the QIB, the Earlham Institute and the Bob Champion building would be far better and our conclusions on rent and demand assume a better location can be agreed – we believe it will benefit all parties to do so.

- **agree a car parking delivery strategy** - we have allowed some cost for car parking delivery but are aware that communal car parking is expected to be provided for most of the parking linked to the building. Our financial appraisals do not assume tenants have to pay additional car park charges.

- **further design the building and engage with occupiers** - a milestone approach, where further release of funds is agreed on specified milestones being attained, should be taken, enabling the respective boards to appropriately manage risk.

- **build communication across NRP** - to clearly establish and sell the benefits for R&D businesses and to build demand which will improve the real estate viability position and encourage private sector development.
1 Instructions

We have been instructed by South Norfolk Council (SNC) on behalf of SNC and the New Anglia Local Enterprise Partnership (NALEP) to prepare a report and advice on a proposed new building on Zone 4 at Norwich Research Park (NRP). NALEP is considering a new building at NRP to complement those already provided across the park, to facilitate further growth of relevant activity in this important research cluster, to build on the infrastructure commitments made by Bullen Developments Ltd (the landowners), SNC and Norfolk County Council and to utilise capital investment to create future income and business rates generation for NALEP and SNC.

Specifically, we have been instructed to provide advice in three areas, as follows:

Demand assessment
Provide an assessment of the potential demand for a new building at NRP, advising on the type and scale of floorspace required, the nature of occupiers it would be sensible to provide space for and the nature of leases it may be reasonable to assume can be achieved. To complete this work, we have agreed to:

i) Make contact with key organisations across NRP that may create or be aware of demand so as to identify the nature and levels of evident current demand, supported by one to one discussions with some end users with known demand.

ii) Assess take-up at comparable projects (including Centrum locally and research parks around the country) and the nature of tenants/leases/rents, based on discussions with relevant parties and our knowledge of such developments across the UK.

iii) Outline trends influencing the demand for real estate focussed on commercial R&D that could influence the nature of demand for a building.

Viability assessment
Using information from above and agreed serviced land values, informed by initial discussions made by SNC with the landowners of Zone 4 (Bullen Developments Ltd), provide development appraisals enabling an assessment to be made of the rates of return that may be available through investment.

Risk assessment
Advise on the risk factors that may be relevant to map, take account of and monitor during any proposed investment programme – including competition that may evolve in the immediate locality, regional and national politics that may help or hinder.

This report outlines our findings and provides recommendations on the building that should be funded with the proposed investment and suggested next steps.
In this report where we refer to wet laboratory space we mean space for biology and chemistry activity that requires benching with sinks and drainage suitable for this activity and which may require fume cupboards or safety cabinets (either mechanically ventilated or re-circulating). Typically, tenants lease write-up space (offices used by laboratory scientists to write up results from their work) alongside wet laboratory space although this isn’t always the case. Dry laboratory space, conversely, does not provide for sinks and drainage in the lab and does not usually involve fume cupboards or safety cabinets. It is typically delivered to enable research and development of the likes of medical devices and electronics. Both types of spaces are likely to have vinyl floor covering but the wet laboratory space will typically be more expensive to deliver as it requires more extensive mechanical and electrical plant, benching, sinks and drainage and often a higher floor to floor height.

2 Norwich Research Park

Norwich Research Park covers approximately 93 hectares (230 acres) and is an internationally significant cluster of teaching, research and clinical excellence. It lies within a concentration of life sciences and biotechnology activity that covers Norfolk and Suffolk and the wider East of England. It is built on the foundation of six partner institutions that have particular strengths (amongst other things) in plant and microbial sciences, genetics and genomics, climate and geo-sciences and food, health and human nutrition:

- The University of East Anglia (UEA)
- The Norwich and Norfolk University Hospital (NNUH)
- The John Innes Centre (JIC)
- The Quadram Institute Bioscience (QIB)
- The Sainsbury Laboratory (TSL)
- The Earlham Institute (EI)

Major investment has been made over recent years to deliver fit for purpose modern real estate to further support the activity of these institutions and to give opportunity for business co-location. In 2018 the new £75 million Quadram Institute Bioscience building will be completed. The concept for the Institute is "to enable a step-change in food and health science research by providing new insights and accelerating innovation that will deliver new food and treatments as well as proactive health and lifestyle interventions". It sits alongside the Bob Champion Research and Education Building (opened 2015). Real estate for commercial R&D has been delivered for Leaf
Systems (January 2017), at the Centrum (July 2014), the Innovation Centre (refurbished July 2011) and the UEA Enterprise Building (June 2015).

In 2013 outline planning permission was granted by South Norfolk Council for development across the four development zones at NRP identified in Figure 1 below. In total approximately 165,000 sq m (1.77 million sq ft) of new development was permitted for research and development buildings, health and health related buildings and ancillary buildings, apportioned as follows:

**Zones 1 & 2 – shaded grey and green on Figure 1**

On land owned by UEA, the John Innes Foundation and the BBSRC, a total of up to 65,000 sq m (700,000 sq ft) of new development for offices and laboratories for research and development activities along with ancillary and complimentary uses with access from Colney Lane and Hethersett Lane (planning reference 2012/1477/O).

Reserved matters consents have subsequently been granted for the Centrum (4,536 sq m GEA (48,825 sq ft)) and the Leaf Systems building (1,000 sq m GEA (10,765 sq ft)). These developments sit alongside the Innovation Centre (formerly IFR2),
Cotman Centre (formerly IFR3), West Site A Building (now being converted for a children’s nursery) and Building 5. The existing QIB Building (formerly IFR1) will become vacant later this year, when QIB relocate, and is expected to be demolished, releasing a development site of around 1.5 to 2 hectares (4-5 acres).

**Zones 3 & 4 – shaded yellow and pink on Figure 1**

On land either owned or under option to Bullen Developments Ltd, a total of 99,166 sq m (1.07 million sq ft) of new buildings is permitted for offices, laboratories and academic space for principally research and development activities (60,387 sq m (650,000 sq ft) for use class B1(b)), buildings for health and health related uses (29,849 sq m (321,000 sq ft) for use classes C2/D1) and buildings for further ancillary and complementary uses (8,930 sq m (96,000 sq ft) as detailed in the NRP Development Framework SPD) (planning reference 2012/1880/O). Reserved matters consents have subsequently been granted for the Bob Champion RE Building (5,010 sq m GEA (54,000 sq ft)) and the Quadram Institute Biosciences building (14,420 sq m GEA (155,000 sq ft)), both on Zone 4.

On 1 April 2016 52 acres (21 Ha) of NRP was designated as an Enterprise Zone (EZ), the extent of the zone being shown by the grey dashed line on Fig. 1 above. Most of Zone 4 lies within the EZ, the exception being the Bob Champion Building (marked G).

**Zone 4 Proposed New Building**

Current development completed or anticipated on this Zone is identified on Figure 2 below. On the eastern side of the Zone, adjoining the NNUH site, lies the Bob Champion RE Building and a 350 space surface car park built under a temporary planning consent (to September 2022). The QIB Building is nearing completion in the north-eastern corner of the Zone and a 208 space surface car park is being constructed to serve this building on land immediately west of the temporary car park identified above. The QIB surface car park is to be accessed from the NNUH perimeter road via a short extension of the existing road serving the Bob Champion Building and the QIB site.

Planning permission has further been granted for a 742 space four storey car park (reference 2016/2382) on land west of the current temporary car park, together with a new roundabout on Hethersett Lane and an access road with associated drainage and services along the southern edge of Zone 4, linking Hethersett Lane with the NNUH perimeter road. The permitted car park would provide 208 spaces for the QIB in a permanent solution and 534 spaces for other NRP south developments off plot parking – providing around 80% of the permitted car parking for this Zone.
The landowners, Bullen Developments Ltd, have submitted a planning application for a 1,142 space four storey multi-storey car park to be located on the site of the current temporary car park. Linked to this application is one to temporarily relocate the 350 space carpark on land west of the Bob Champion RE Building. The proposed multi-storey car park would accommodate the QIB parking, other Zone 4 off plot parking and re-provide the 350 spaces currently provided at ground level. A decision is pending on these applications. The timing of delivery of the access road from Hethersett Lane is not yet known.

At this stage the location of any future building on Zone 4 funded by SNC/NALEP is also not known.

We are informed by the landowners that such a site would be serviced by them to provide surface water and foul drainage, gas supply and telecoms supply such that development on plot could connect to these services. Electricity supply would similarly be provided to the edge of the serviced plot, although we are informed that the potential developments described above are such that the allocation to this plot would be in the range of 250-350 kVA. Expert advice is required to identify the type of use this power limit will apply but we understand it could serve a building for general office use and limited dry laboratory use but could likely limit the scale of any specialist laboratory use given the expected M&E power requirements.
Car parking for the building is expected to be provided at the ratio of 1 space per 60 sq m GIA, as per the outline planning permission. We have assumed that this quantity of spaces will be available to occupiers of the building in perpetuity or for the duration of a long lease at no additional annual cost beyond the initial land price.

3 Existing demand and supply across NRP

Various spaces have been delivered across NRP to provide accommodation for organisations undertaking commercial R&D activity. These include new purpose-built facilities such as the Centrum, Leaf Systems Building and Enterprise Centre as well as repurposed buildings such as the Innovation Centre and Children’s Nursery.

We include at Appendix 1 a schedule of these spaces identifying the total space delivered, the type of space, the amount that has been let and is currently available for letting and the broad terms on which leases have been granted.

In total there are 35 occupiers (either in office suites or co-working space) currently in the Enterprise Centre on the UEA site and 29 different occupiers in the space delivered across Zones 1 and 2, including space occupied by UEA, NNUH and JIC in the space delivered for third parties. In addition, there are 39 virtual tenants across NRP who pay to be associated with the park under the schemes operated by NRP LLP and the Enterprise Centre.

The space delivered and available can be summarised as follows:

<table>
<thead>
<tr>
<th>Building (date opened)</th>
<th>Type of space</th>
<th>Total lettable space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Centre</td>
<td>Co-working space</td>
<td>42 desks on first floor</td>
</tr>
<tr>
<td></td>
<td>Offices</td>
<td>Seven suites totalling 243 sq m (2,613 sq ft)</td>
</tr>
<tr>
<td>Innovation Centre (excl NNUH Microbiology on 2nd floor)</td>
<td>Wet Laboratory</td>
<td>16 suites totalling 828 sq m (8,912 sq ft)</td>
</tr>
<tr>
<td></td>
<td>Offices/Write up</td>
<td>22 suites totalling 575 sq m (6,186 sq ft)</td>
</tr>
<tr>
<td>Centrum</td>
<td>Wet Laboratory</td>
<td>8 suites totalling 742 sq m (7,982 sq ft)</td>
</tr>
<tr>
<td></td>
<td>Offices/write up</td>
<td>12 suites totalling 1,295 sq m (13,942 sq ft)</td>
</tr>
<tr>
<td>Building 7 (Leaf Expression)</td>
<td>Office/laboratory</td>
<td>880 sq m (9,470 sq ft)</td>
</tr>
<tr>
<td>Building 5</td>
<td>Clinical trials</td>
<td>185 sq m (2,000 sq ft)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Cotman Centre (NNUH)</td>
<td>Offices/laboratories</td>
<td>2,880 sq m (31,000 sq ft)</td>
</tr>
<tr>
<td>West Site A (Chestnut Day Nursery)</td>
<td>Children’s nursery</td>
<td>485 sq m (5,220 sq ft)</td>
</tr>
<tr>
<td>Earlham Institute Bioincubator (2nd floor)</td>
<td>Offices</td>
<td>388 sq m (4,177 sq ft)</td>
</tr>
<tr>
<td></td>
<td>Wet Laboratory</td>
<td>851 sq m (9,155 sq ft) (part now training space)</td>
</tr>
</tbody>
</table>

Overall, R&D office space has generally been provided in small suites, ranging from 16 sq m to 180 sq m (169 sq ft to 1,940 sq ft) with a total of around 2510 sq m (27,000 sq ft) of lettable suites having been delivered in the Enterprise Centre, Innovation Centre, Centrum and EI Bioincubator. Of this only 167 sq m (1,797 sq ft) or 7% is currently available (being neither let, under offer or reserved) and so take up of this space has generally been good. For note some of the space in the Centrum originally identified for wet laboratory space has been fitted out as office space and is included in the total above as such.

Wet laboratory space has been delivered in suites from 26 sq m to 94 sq m (284 to 1,017 sq ft) across the same buildings, with a total of 2,420 sq m (26,049 sq ft) provided (excluding the intended laboratory space in the Centrum fitted out as offices). Some of this has been taken out of laboratory use in the Earlham Institute (where it has been converted to training space) and at present 690 sq m (7,426 sq ft) or 28% is available.
Rents are highest for the best quality space, in smallest suites and let on the shortest lease commitments. Leases range in length depending on the size of suite and building but range from monthly licences up to five-year commitments before lease expiry or tenant break dates.

Of note UEA, JIC, EI and NNUH occupy significant parts of the available office and wet laboratory space across the various buildings that have been delivered or converted for third party use.

**The Norwich Office Market**

Bidwells LLP latest research on the general (ie not restricted to R&D use) office market in Norwich published in February 2018 is based on data to December 2017. This research shows take up of office space for 2017 reached 15,524 sq m (167,100 sq ft), falling below trend levels for the first time in five years. For note, however, an additional 12,356 sq m (133,000 sq ft) of office space was acquired for conversion to residential use, so the overall amount of office space ultimately let/sold and taken out of the availability schedule was actually 27,905 sq m (300,378 sq ft). The largest transaction of the year was the letting of 1,538 sq m (16,550 sq ft) to Price Bailey, who moved to larger premises on St Andrews Business Park.

Figure 3 below shows take up in terms of the quality of space. Most of the take up was in space classified by Bidwells as Grade B (76%) with Grade A space accounting for around 20% of take up and poorer Grade C space around 4%.
Figure 3 also shows the requirements registered with Bidwells for companies looking for office space, where there is a notable increase evident over the last year. Overall requirements now stand at around 14,957 sq m (161,000 sq ft) with one requirement of 30,000 sq ft, two of 10-20,000 sq ft and the remainder all for sub-10,000 sq ft of space.

Overall supply of available general office space in the Norwich market is falling quite drastically. At the end of 2017 it stood at 30,673 sq m (330,159 sq ft). Availability in the city centre at that time was just over 18,301 sq m (197,000 sq ft) with the remaining space being out of town and on the business parks. Out of the total supply level, only 5,907 sq m (63,582 sq ft) would be classified as Grade A, making up just 1.2% of the 511,000 sq m (5.5m sq ft) of total office supply across the city. As shown in Figure 4 below, Bidwells data shows total office availability having fallen by almost
half since 2012 – as existing stock has been acquired, some stock has been lost to residential use and very little new space has been bought to the market.

Annual rents for both prime and secondary general offices have stabilised with headline rents for prime offices with on-site car parking at £16.50 psf and good quality refurbished offices with on-site car parking achieving around £14.50 psf following a period of strong rental growth (see Figure 5 below). Office occupiers typically require a 10 year term with a 5 year break clause, although tenants of smaller office suites can seek more flexible terms. Rent free periods now rarely exceed 6 months unless they are being granted to allow the tenant to refurbish the accommodation to some extent.

Offices are also available on the Broadland Business Park within modern high specification buildings at quoting annual rents of £14.50 to £15.00 per sq ft.
At these rental levels, new development is hard for the private sector to justify unless it is pre-let to a good covenant on a long lease and so supply looks unlikely to increase by much. The lack of supply is, however, clearly quite acute and this could mean that those developing new accommodation could potentially drive rents to new levels should demand remain firm. Over time this will help viability for new development, provided rental growth can outstrip cost inflation and investment yields remain constant.

For note, most of the office demand covered in the above Bidwells data will relate to pure office use that does not involve R&D activity. We would expect those seeking to undertake R&D to generally show a natural preference for Norwich Research Park.

4 Trends likely to influence demand

In our work across the UK advising on real estate delivered for commercial R&D and with our knowledge of international best practice in the sector, we have identified a number of trends in R&D and research activity that are likely to influence demand for floorspace into the future at locations such as Norwich Research Park. We have set
these out in detail at Appendix 3 and summarise them below, giving in each case an indication of what we would see as the potential impact on the demand for real estate.

R&D trends

Trend 1: Open Innovation

Identified by the US academic Professor Henry Chesbrough, Open Innovation is where businesses no longer rely entirely on their own ideas to advance their business, nor restrict their innovations to a single path to market. Instead they strategically leverage internal and external sources of ideas, working with a variety of partners, and take them to market through multiple paths.

Potential Property impact

In pursuing the open innovation business model for product and service development companies are moving away from large corporate R&D, self-contained, environments in remote locations. They are typically relocating teams of staff involved in R&D to locations where they can work alongside others for mutual benefit. Those others will include both academic researchers and those involved with corporate R&D – across all sizes of firm. Large companies seek relationships with Small and Medium Sized Enterprises (SMEs) for their highly innovative ideas, whilst SMEs find benefit from conducting business with larger firms – often as customers to which they can sell services and technologies.

In developed countries the open innovation hot-spots will be particularly attractive to end users undertaking R&D and demand will be high. As Norwich grows its research base and the value add proposition one can expect demand to grow.

Trend 2: Diversification

As companies pursue product and service development using open innovation they find that their new technologies and intellectual property have application in other markets – some of which they might sell services into but some of which they may wish to actively participate in. Examples abound of ‘high tech’ companies diversifying into whole new market areas, particularly including the Life Sciences. Google established Alphabet as a parent company for Google and non-Google businesses in 2015 to be able to grow – the latter of which now includes Verily, a Life Sciences business working at the intersection of health, data and research.

Potential Property Impact

As businesses look to exploit their technologies, intellectual property and distinctive capabilities, they may seek to put teams of people undertaking R&D into new
locations. They will want to operate closer to potential new partners and customers in these new sectors. Once more it provides a particular gravity to those places strong in open innovation capability, and particularly where there is global excellence in particular sectors. For Norwich Research Park where a number of related themes are already evident and the applicability of that work is growing there may be more attraction for businesses to come in.

**Trend 3: Patient engagement and outcomes-focused product and service development**

*Trend*

In the US the cost of prescription drugs are particularly high and the problem of expensive prescription drugs is seen to be a growing one - with government intervention (to the detriment of company profits) a real possibility. Prescription drug manufacturers are therefore coming under pressure and pharmaceutical and biotech companies are likely to need to demonstrate more than ever the efficacy of their products and refine them so that they are more effective for the people they seek to treat. And for note, all of this is at the same time that they need to reduce the costs of development because patent protection periods of lead drugs developed years ago are now expiring.

*Potential Property Impact*

There is likely to be a growth in precision medicine activity; enhanced need to develop products and services closer to clinician and patient care activity. We might see a reduced need for wet laboratories as computational biology and enhanced data analysis become more important to drug manufacturers; and as historic pathways to drug development change.

These issues are likely to mean an increasing need for software and Artificial Intelligence (AI) R&D activity, with increasing need for office space; and an increasing need for close liaison with clinicians and patients. All of this is likely to mean that proximity to leading hospital-based research activity is of greater importance to some.

Across the UK there are not many significant hospitals that also enjoy research/commercial R&D activity co-located. This means that Norwich Research Park has a healthcare dimension that is not easy to find across the UK and if the benefits that can flow from co-location are worked on there could be growing demand from businesses wanting clinician/patient engagement. It is helpful that the new Quadram Institute sits at the confluence of the hospital and other activity on the research park. It helps bring relevant health related research into the Research Park territory.
Trend 4: Urbanisation

Trend

In 2014 The Brookings Institution produced a paper on The Rise of Innovation Districts.¹ These districts are geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also physically compact, transit-accessible and technically wired, offering mixed-use housing, office and retail. It is for particular note that they classify anchor institutions as research universities and research-orientated medical hospitals with extensive R&D activity.

Potential Property Impact

How cities evolve will be determined by the collective actions of city governments, people and businesses, but as a general principle, cities are becoming more dynamic than ever before and demand for good quality, accessible space within them is likely to continue to increase. Key city centres and key city districts within globally significant research clusters are likely to experience most demand and have most to gain into the future.

For Norwich Research Park this means that strengthening the position of the location as a vibrant district of the city, well connected to the centre, is really important into the future.

Trend 5: Importance of Digital

Trend

Digital technologies are transforming all industry sectors. 25% of total patent families now being registered relate to digital technologies. Whilst EU based companies lag behind the US and Japan in ICT technological development, the EU has a lot to offer businesses from around the world. Within companies based in the US, more than 20% of US patenting in ICT relies on inventors located offshore and their second strongest patent portfolio location is the EU.²

Potential Property Impact

Within the Life Sciences Sector a greater proportion of R&D work is likely be office and dry-lab based, as data exploitation and use of data in analysis and product development becomes ever more important. There is therefore the potential for less wet laboratory space to be needed as a proportion.

¹ The rise of innovation districts, Katz and Wagner, The Brookings Institution, 2014
² EU Industrial R&D Investment Scoreboard, 2017
For Norwich Research Park this means that new development may well need to deliver more R&D office than wet laboratory space.

**Trend 6: Outsourcing**

*Trend*

Outsourcing includes non-physical engineering R&D tasks such as designing, simulation, and consultation to specialised firms, along with the outsourcing of laboratory-based experimentation and trials to specialist organisations. It implies factors including improvement in distinct processes, efficiency enhancement, cost advantage, and reduced time-to-market for products.

*Potential Property Impact*

Outsourcing means that work can be undertaken in cheaper locations in any particular country and indeed at times overseas. It can mean that laboratories being vacated by large pharmaceutical companies can be re-purposed to provide very cost effective fitted laboratory space. Users of such accommodation can access good quality technical equipment. CROs, particularly, will be able to move into such accommodation and offer their client group very cost-effective services, thus enabling the large pharmaceutical and biotechnology companies to reduce floor space needs in the most expensive locations.

This may have some relevance at Norwich Research Park, where rental costs are relatively low when compared to the rest of the South East.

**Trend 7: Productivity gap**

*Trend*

The annual EU Industrial R&D Investment Scoreboard of 2017 guides that even for the top 2,500 R&D spenders in the world, productivity may not be very high. They suggest that in health industries this can be partly explained by the existence of many small biotech companies that have considerable amounts of R&D funding and R&D activity, but little in terms of sales.

*Potential Property Impact*

Property providers serving the healthcare R&D sector have a vast range of covenant strength occupiers to let space to. There is likely to be an ongoing presence of R&D intensive biotechnology companies serving the sector that are yet to make profit, although under the open innovation model for product and service development the larger corporates are going to have ongoing desire to work with such organisations. With an ongoing productivity gap of some significance it is likely that the best places for open innovation are going to need to cater for poor profit makers if they are to attract in the companies that make high profits – it is a phenomenon likely to continue.
indefinitely and where the property industry/governments (central and local) need to develop plans that can accommodate this.

For Norwich Research Park this means that developers/investors willing to put up buildings for income return as opposed to selling on the building for profit within a short period of time are best placed to develop floor space for the sector. Over time, it may be that more significant businesses may have requirements to sit alongside the smaller businesses and capital value of the property can therefore be lifted.

Research trends

Trend 1: Growing importance of collaboration

Trend
At institutional level there is a strong correlation between levels of international collaboration and quality of research. Harvard produces the highest number of collaborative research articles and it is third in the QS Global Rankings of Universities, 2018.

Potential Property impact
The UK has at least eight universities with an average research citation impact more than 80% above the global average and is cited as a desirable global collaboration partner into the future.³ If UK universities continue to be world leading and collaborate extensively then the research excellence is likely to continue to attract businesses to the UK to undertake commercial R&D (as well as for there to be ever more spin-out businesses developing products and services using the science/technology flowing out of these institutions).

We consider that the Norwich Research Park stakeholders are involved with a range of high quality research and the opportunities for collaboration amongst co-located partners that in many instances work at international level is a great area of advantage for Norwich Research Park to exploit into the future.

Trend 2: Growing importance of interdisciplinary work

Trend
Since the mid-1980s, research papers have increasingly cited work outside their own disciplines. Analysis shows that the fraction of paper references that point to work in other disciplines is increasing. The fraction that points to another speciality in the same discipline (for example, a genetics paper pointing to zoology) shows a slight decline.⁴

³ British Council, Higher Education global trends and emerging opportunities to 2020, 2012
Potential Property impact
As the importance of inter-disciplinarity grows there may be polarization of research excellence to those locations where there are institutions involved with research excellence in breadth as well as depth. Businesses looking to capitalize on research excellence may find that their needs are best satisfied in the locations where universities and other institutions are strong across a range of disciplines.

For Norwich Research Park we would see that there is already a good range of related activity on site. Cambridge is within a relatively short distance and we believe that the breadth and depth of activity here needs to be capitalised upon too.

Overview on what this means for property demand into the future
A period of significant change is underway. Open Innovation has come to the fore as the business model for product and service development.

We suggest the following key trends:

1. Growth in demand for Open Innovation Hotspots that sit at the heart of established research/R&D intensive clusters – where there will be a need for more office, wet and dry laboratory and specialist floor space at these locations.

2. Growth in demand for hospital-based locations where there is both teaching and leading-edge research – where demand will come from clinical, research and R&D intensive organisations.

3. Growth in the need for the property industry to deliver generic, flexible and adaptable floor space to serve the sectors evident at NRP.

4. Growth in the need for the property industry to deliver places that help facilitate community development and enhanced levels of collaboration.

NRP has the potential to cater to many of these trends and we could see growing demand for floor space in the location if genuine added value is seen by a range of business types and sizes. Many of the foundations are there. The cluster has real potential to grow activity – and real estate can usefully be expanded in this location to help facilitate this; to ensure that property availability is not a brake on potential growth rates and growth of the local economy.
5 NRP Stakeholder engagement

Research institutions within a cluster have a key role to play in determining the potential level of demand for floorspace from organisations undertaking commercial R&D alongside them. The quality and breadth of the research, the calibre of people being educated and trained at them, the number of spin out businesses they create and the way they interact with industry and add value through close collaboration all have a bearing on the nature and scale of floorspace that is required for commercial R&D.

We have therefore seen a key element of this study as being the engagement with senior knowledge transfer personnel at the key stakeholder organisations across NRP, in order to assess, as best as possible given the limited time available for this commission, what their expectations and plans are for growing their own activity, how they interact with industry and whether they are seeing a need for real estate to be delivered alongside them to facilitate that engagement. This has a material effect on the demand that we might expect to see for new real estate at NRP.

We have also interviewed personnel at NRP LLP and UEA who manage and deliver real estate for commercial R&D occupiers, as well as Bidwells LLP, letting agents at NRP.

We summarise the key findings from those discussions below.

- All the interviewees we spoke to advised that their organisations were actively engaging with industry but at the present time many of those engagements don’t need physical space for that activity to take place.
- Interviewees reported that the commercialisation of knowledge was not all about creating companies, it can be about partnering and licensing, so whilst spin out companies are being created this is not the only way the stakeholders are getting knowledge into the economy.
- The partners all want to see NRP successful and are working hard to grow businesses but it isn’t an easy or quick process. Some of the stakeholder organisations are long established but others are newer and it will take time for them to establish their brand to then grow co-location activity.
- A number of interviewees stated there needed to be clearer messages as to what the unique selling point of NRP is and why businesses would want to come here, as well as better co-ordination and communication between the partner organisations. In a number of our discussions it was stated that better communication is needed to get across to industry what the “offer” across a breadth of activity is.
• It was stated that it is good to have a mix of R&D activity here as innovation is happening at edges of disciplines and this would broaden the offering and appeal of NRP to businesses.

• Offering low cost space was cited as important as well as making the process of taking space really customer focussed – although it was also acknowledged that if the offering in terms of added value to business is right, then the rent is less of an issue.

• The soft infrastructure – programmes and events designed to build collaboration across the park and a sense of community - was identified as being really important to work on and invest in, it is not just about providing physical spaces.

• The stakeholder research organisations at the park identified that they do need to use space across the park from time to time to give them opportunity to grow, move teams around and redevelop their own space, so providing extra capacity is helpful.

• It was stated by a couple of interviewees that it is important to grow the business base from bottom up, working to create SME’s, rather than necessarily focussing on attracting in a large corporate – and that a vibrant SME base would itself help to attract in larger organisations. Concern was also raised that bringing a single large corporate at scale to NRP might dominate the commercial landscape, potentially deterring others.

• It was recognised that any building built needs to be successfully occupied as this helps maintain momentum and a sense that things are happening in Norwich.

6 Experience from relevant projects across the UK

We outline in this section some relevant lessons learnt from R&D clusters across the UK and overseas where commercial real estate has been delivered through public sector funding. Clearly every situation will be slightly different – with different research concentrations, commercial activity, demand and supply dynamics etc – but we think that the information provided below can guide on how investment might be made here by SNC and NALEP.
Delivery of space can help research stakeholders grow relevant activity

In Edinburgh, the public sector has been funding over several years the development of a health sciences cluster, built around the Edinburgh Royal Infirmary and the Edinburgh University Clinical School. Research excellence has been built in specific areas including stem cells and regenerative medicine. In May 2012 the Scottish development agency, Scottish Enterprise, completed speculatively a 8,547 sq m (92,000 sq ft) GEA building (Nine) to house organisations undertaking research and R&D. The ground floor provides small scale (sub-93 sq m (1,000 sq ft)) suites of office and laboratory space and the first and second floors were to house larger suites for businesses to grow into. The second floor now houses activity from across a number of research organisations including the University of Edinburgh, National Services Scotland (NHS) and the Usher Institute working on big data science. The availability of this space has facilitated the clustering and growth of this activity.

Having space available can enable research collaborations to grow

The UK Government, through the Oxford City Deal, and Oxford University have funded the delivery of a bio-innovation centre adjoining the research and clinical activity at the Old Road Campus, Oxford. The Bioescalator Building was conceived to create small scale (sub 93 sq m (1,000 sq ft)) suites of offices and laboratories to support the growth of health science companies. Planning permission for the building was granted in June 2015 and in January 2017 the University and Novo Nordisk announced a £115m research collaboration in diabetes research would be housed on one floor of the building. The centre is due to open in Summer 2018. The development of plans for the building and the provision of funds for its development provided certainty for the University in their discussions with Novo Nordisk, which arguably helped them conclude the collaboration arrangement.
Delivery of space can help continue cluster growth

A further project funded by the Oxford City Deal was the Innovation Accelerator on Oxford University’s Begbroke Science Park. The University had already invested over a number of years in research space and commercial R&D space at this location outside Oxford. Funding from the City Deal and the University enabled the delivery of a 2,230 sq m (24,000 sq ft) extension to the Centre for Innovation and Enterprise to enable companies on the park to grow and further businesses to be attracted. The building was designed to be flexible, being capable of housing activity in medicine, big data, material and engineering. Works started speculatively on this building in November 2015 and it opened in March 2017 by which time it was 60% let. Given the time required to develop new real estate, progressing design and delivery ahead of demand can be very important to enabling a cluster to continue to grow.

Location of a building within a cluster is important

In our experience the proximity of research and collaboration facilities relative to each other is very important. Distance really does matter and facilitating connections between buildings and the positioning of amenity and central facilities requires care.

In Edinburgh, Scottish Enterprise funded the development of their Nine building (which is shown bottom right in the picture), as well as infrastructure to serve building plots. Due to development agreements put in place by SE, the building was located some distance from the main clinical and research activity at the Royal Infirmary (shown top left) and from adjoining research buildings (the Scottish Centre for Regenerative Medicine is positioned centre right). This distance, whilst only a 15-minute walk, hampered the rate of take up of the commercial R&D space in Nine. Clustering buildings together around good public realm, with better linkages between buildings, would have been preferable. Further investment is now being made in a Centre for Tissue Repair on
land next to Nine and it is interesting to note this includes a new walkway linking better the building to the research activity.

**Commercial R&D demand exists in clusters focussed on similar research areas to NRP**

Wageningen University and Research is a teaching and research centre in the Netherlands that focusses specifically on the theme of ‘healthy food and living environment’. The stakeholders there have been working to build a cluster of research and R&D intensive business in this domain and BioPartner Center Wageningen was developed in 2001 as the ‘Food Valley Incubator’ with the purpose of creating an entrepreneurial climate for the activity.

Over the years the initiative has proven particularly successful, so that further buildings have been delivered for business R&D activity and in 2017 Unilever began construction of its new world-wide Foods Innovation Centre on the campus. For note, in the first five years of the incubator’s existence the public sector offered extra financial support to researchers as they sought to engage. In our experience, such initiatives materially affect the levels of business formation.

Wageningen demonstrates that a cluster of research and commercial R&D activity centred around the theme of food and health can be progressed successfully, provided all the various elements required to attract commercial R&D businesses are in place.

### 7 Form of the Proposed Building

The interviews and research we have undertaken for this study lead us to conclude that there is a real need for new investment in real estate to ensure the continued growth in relevant activity. We advise that demand will currently be greatest for a building that provides R&D office/dry laboratory space rather than wet laboratory space. The take up of wet laboratory space across NRP has been less than anticipated in recent years, some further space is expected to come forward with the QIB, and given the constraints on budget and electrical power, we do not think it would be prudent to deliver further laboratory space at this stage, which typically comes at additional cost. Conversely the supply of R&D office space across NRP (and indeed office space in Norwich overall) is now very limited and it is conceivable that such
space will be let during this calendar year. With a build time of up to 2 years (including design, planning and construction) anticipated it is absolutely the case that the delivery of new space should now be considered.

We advise that given the nature of research across the park, it would be prudent for the building to be designed such that it is capable of being fitted out in part as dry laboratory space, through the provision of additional slab to slab height and glazed loading doors at ground floor. Enhanced electrical power provision over and above that which would be provided for an office should be explored.

We set out in section 8 below our assessment of the viability for such a building. Based on very high-level cost estimates provided by Bidwells LLP, we conclude that a two-storey building in the order of 1,800 to 2,300 sq m (20,000 to 25,000 sq ft) GIA ought to be possible to develop within the budget, which we estimate will require a site of approximately 0.4 ha (1 acre). A building of this size might be expected to deliver circa 1,580-1950 sq m (17,000-21,000 sq ft) of net lettable space and we would estimate it might then house 150-200 people. It would not need to provide significant communal space for meetings or break out within it as it would be expected companies would provide their own tea points/kitchen areas and staff would access catering facilities across the park – indeed it should be encouraged that they do so to help viability of existing facilities and build the community.

We would expect the building to be capable of housing up to 6 or 7 companies, requiring therefore individual suites no smaller than 232 sq m (2,500 sq ft). Smaller suites than this would place the building in competition with other facilities already provided on the park and would not provide the opportunity for companies to grow or larger lettings to be attracted. Care will be needed in the timing of fit out so that money is help back for sub-division and final fit out until it is needed – but importantly the budget must be retained for initial fit out so that tenants are not burdened with this cost.

8 Viability Assessment

Blank

9 Risk Assessment

Real estate development will always involve risk. We set out below some areas of risk that SNC/NALEP need to be aware of; and potential means to mitigate each risk.
Location – the location of the building on Zone 4 will be very important. At this stage the buildings on this zone lie in the north eastern corner close to the other stakeholders and research activity. The proposed location for the building is at the south western corner, due to other land being reserved for car parks or potential future developments. We would expect occupiers to find this location sub-optimal given the distance it would be from other activity, possibly for several years. We would urge SNC/NALEP and the landowner to reconsider the location and seek to identify one close to other activity including that on NRP North in order to maximise the chances of successfully letting the building. Our appraisals assume good integration into the activity across the Research Park and this is difficult to achieve in the South West Corner.

Construction – building design and construction will need to be progressed with an experienced consultant team and contractor. The landowners do have good experience of building delivery in this location so if they require the build contract to be let to Carter, we would expect them to be able to successfully deliver the building, with a good professional team advising the building funders.

Letting – commencing development prior to signing up pre-lets will clearly increase the risk of voids post completion. Work can be put in hand at this stage to develop initial design and seek at least partial pre-letting of the building in order to reduce this risk. Our demand work has involved very little contact with potential occupiers, due to the time constraints on this study, but we have seen evidence of potential demand and work should be progressed with these and other potential occupiers to see if pre-letting agreements can be put in place before design and construction costs are more fully incurred.

Economic – the success of letting the building will clearly be affected by macro and micro economic risks. The uncertainty over the Brexit process and the impact it may have on innovation and R&D means that for this type of real estate project care is required in taking steps to manage costs of design and delivery prudently, setting milestones for commencement of design and construction that might include a level of pre-letting.

Void costs – if the building is not pre-let to occupier/s prior to or during the construction phase, costs will need to be allowed for the period up to letting the building. These would include building insurance, estate service charge, building utilities, any ground rent (should this model be preferred), empty business rates (should these be levied given the EZ status) and security. This report has not sought to set out the potential level of these costs so work to identify cost items and model them more fully will be necessary to develop a thorough business case.
Recommendations and Next Steps

In summary, our research and experience lead us to advise SNC and NALEP that there is a need to deliver additional real estate at NRP to build on the commercial R&D base that has been growing steadily on the park, if growth opportunity is to be realised in this location. Supply is becoming limited, particularly for R&D office space and the real estate development period is such that commencing work now is prudent so that growth isn’t stifled through lack of availability, particularly given the current challenges in this location for the private sector in creating viable development. Building more floorspace now creates more critical mass of activity that can ultimately help build demand in the future given what we have said in this report about Open Innovation. It also will increase the vibrancy on Zone 4 and provide commercial R&D activity alongside the research/clinical activity at the QIB and Bob Champion Building – which will encourage other businesses to locate in this zone.

It is our advice that a two-storey R&D office/dry laboratory building in the order of 1,950 sq m to 2,320 sq m (21,000 to 25,000 sq ft) Gross Internal Area is the right building to consider investing in on Zone 4, in order to provide capacity for research partners across NRP, for R&D businesses to grow onto from existing space and for new tenants of reasonable scale to come to the park and add to the growing industrial base.

We would suggest the following steps are now taken to progress design and delivery:

1. Progress discussions with the landowners regarding potential location for the building, expected land costs/basis of acquisition, car parking delivery and detail on services to be provided to the plot.

2. Develop initial design work for a building in order to allow promotion of the building and engagement with the planning authority.

3. Commence marketing to seek to secure pre-lets for some or all of the space, having determined the level of pre-lets required to trigger development of the building. This should be progressed in conjunction with the research partners across NRP who can help identify potential occupiers. It is important to have specialist advisors/agents involved in the journey in order to secure the best terms possible.
4. Develop a detailed cost plan and cashflow for the building, identifying risk areas and sensitivity.
Appendix 1
Blank
Appendix 2

R&D Trends
R&D trends

Trend 1: Open Innovation

Trend

In 2003 Professor Henry Chesbrough, a Harvard academic wrote 'Open Innovation, The New Imperative for Creating and Profiting from Technology'. At the time, this was a new concept. He advised that 'in today’s information-rich environment, companies can no longer afford to rely entirely on their own ideas to advance their business, nor can they restrict their innovations to a single path to market. As a result, the traditional model for innovation, which has been largely internally focused, is becoming obsolete. Emerging in its place is a new paradigm, "open innovation," which strategically leverages internal and external sources of ideas and takes them to market through multiple paths’.

In 2013 the Garwood Center for Corporate Innovation at the University of California, Berkeley, and the Fraunhofer Society in Germany, teamed up to conduct the first large sample survey of open innovation adoption among large firms. Surveying companies in both Europe and the US with annual sales in excess of US$ 250 million, they found the following:

- 78% of firms reported practicing open innovation
- No firms reported abandoning the practice of open innovation
- 71% reported that top management support for open innovation is increasing
- 82% report that, compared to 3 years ago, open innovation is practiced more intensively

In December 2017 AstraZeneca confirmed that since it moved its global headquarters to Cambridge in May of 2016 it has delivered over 130 collaborations with academic, healthcare and research partners. This is open innovation operating in practice. Examples include AZ drug discovery scientists working with Microsoft to use a cloud-based simulation tool that brings alive the millions of potential changes that make cancer cells multiply uncontrollably, to better understand the disease; scientists from MedImmune (part of AZ) and Cancer Research UK working together to discover and develop novel biologics to treat cancer; and a novel agreement that provides researchers from the University of Cambridge access to key compounds from AZ’s drugs pipeline.

Potential Property impact

In pursuing the open innovation business model for product and service development companies are moving away from large corporate R&D, self-contained, environments in remote locations. They are positioning teams of staff involved in R&D in locations where they can work alongside others for mutual benefit. Those others will include

---

5 Hass School of Business and Fraunhofer Institute, Managing Open Innovation in Large Firms, 2013
both academic researchers and those involved with corporate R&D – across all sizes of firm. Large companies seek relationships with Small and Medium Sized Enterprises (SMEs) for their highly innovative ideas, whilst SMEs find benefit from conducting business with larger firms – often as customers to which they can sell services and technologies.

In developed countries the open innovation hot-spots will be particularly attractive to end users undertaking R&D and demand will be high. In this way the globally significant, leading clusters will experience most demand, all other factors being equal. In developing countries research in 2006 showed that the growth potential of the market had strongest ‘pull’⁶, although the second factor was found to be quality of R&D personnel. So even in those countries, and at that time, open innovation hotspots (as best they might be able to offer) will have been of significant importance. Research by Carlino and Hunt in 2012⁷ found the clustering of R&D laboratories ‘to be by far the most significant at very small spatial scales, such as distances of about one-quarter of a mile’. They discovered that the clustering effect quickly dissipates with distance, concluding knowledge spillovers to be highly localized.

**Trend 2: Diversification**

*Trend*

Corporate diversification emerged as a major trend in the 20th Century. In 1949 approximately 1/3 of the Fortune 500 industrial corporations generated revenues from more than one product line. By 1974 the proportion of diversified firms had doubled to 67%⁸. In the 21st century the open innovation model of product and service development has taken diversification to new levels and in 2016 Pfizer Innovative Health Group President Albert Bourla quoted at the Financial Times Global Pharmaceutical and Biotechnology Conference that he and other business leaders were all agreed that their particular industry is undergoing a massive paradigm shift. He guided that whilst conventional wisdom defines the preferential position of focus as how narrow a company’s scope of business is, a more helpful definition of focus considers how much each of a company’s businesses materially benefits from the distinctive capabilities that make the overall enterprise better than others. As companies pursue product and service development using open innovation they find that their new technologies and intellectual property have application in other markets – some of which they might sell services into but some of which they may wish to actively participate in. Examples abound of ‘high tech’ companies diversifying into whole new market areas, particularly including the Life Sciences.

---

⁶ Here or there? A survey of factors in multinational R&D Location, 2006


⁸ Rumelt, 1974, 1982 and referred to in Diversification Strategy and R&D intensity in Multiproduct Firms, 1989
established Alphabet as a parent company for Google and non-Google businesses in 2015 to be able to grow – the latter of which now includes Verily, a Life Sciences business working at the intersection of health, data and research. Other businesses not typically associated with healthcare now have very significant ambition for product and service development to the sector, including Apple, GE, Microsoft, Olympus, Oracle, Philips, Siemens and SoftBank (through ARM).

Pharmaceutical and biotech companies, historically seen as the bedrock of the Life Sciences sector, have been less progressive in this evolution, although there is clear evidence of the trend. GSK, the UK’s second largest ‘pharmaceutical’ company now has three business area portfolios – prescription medicines, vaccines and consumer healthcare products (that include Aquafresh and Sensodyne toothpastes for example).

**Potential Property Impact**

As businesses look to exploit their technologies, intellectual property and distinctive capabilities, they may seek to put teams of people undertaking R&D into new locations. They will want to operate closer to potential new partners and customers in these new sectors. Once more it provides a particular gravity to those places strong in open innovation capability, and particularly where there is global excellence in particular sectors.

**Trend 3: Patient engagement and outcomes-focused product and service development**

*Trend*

Costs of prescription drugs vary around the world. In the US they are particularly high and the problem of expensive prescription drugs is seen to be a growing one - with government intervention (to the detriment of company profits) a real possibility. Net spending on prescription drugs in the US increased by approximately 20% between 2013 and 2015, with prescription drugs now comprising 17% of all healthcare costs.⁹

Prescription drug manufacturers are therefore coming under pressure. Into the future pharmaceutical and biotech companies are likely to need to demonstrate more than ever the efficacy of their products and refine them so that they are more effective for the people they seek to treat. And for note, all of this is at the same time that they need to reduce the costs of development because patent protection periods of lead drugs developed years ago are now expiring.

⁹ Journal of the American Medical Association article by researchers at Harvard Medical School, 8.16
Johnson and Johnson, through their subsidiary Janssen, have won awards for their innovative approach to product and service development. Their Janssen Healthcare Innovation’s Care4Today programme was crowned ‘Most Valuable Patient Initiative’ and ‘Most Valuable HCP Solution’ at the Eyeforpharma Barcelona awards in 2015. Jane Griffiths, Company Group Chairman of Janssen EMEA advised in 2016 that ‘the whole industry has been through a major change – a change that requires continual effort to drive away from the old business model, to a new and improved patient-centred model’. Janssen opened a new Centre for Dementia Prevention at Edinburgh’s BioQuarter in the UK in 2016, close to the Edinburgh Royal Infirmary.

In 2016 Verily concluded a deal with pharmaceutical giant Biogen to create better drugs for patients who have multiple sclerosis, a disease that attacks the nervous system. A Verily team is working with Brigham and Women’s Hospital on a research study with 2,000 MS patients and where each patient is outfitted with a miniature sensor that amongst other things can measure the rhythm and strength of the patient’s heartbeat, along with reactions to light and noise exposure. Verily uses its computing power to analyse all data and look for signals or patterns that can help explain why some patients experience MS symptoms earlier, and how these symptoms could be prevented with drugs.

**Potential Property Impact**
There is likely to be a growth in precision medicine activity; enhanced need to develop products and services closer to clinician and patient care activity. We might see a reduced need for wet laboratories as computational biology and enhanced data analysis become more important to drug manufacturers; and as historic pathways to drug development change.

These issues are likely to mean an increasing need for software and Artificial Intelligence (AI) R&D activity, with increasing need for office space; and an increasing need for close liaison with clinicians and patients. All of this is likely to mean that proximity to leading hospital-based research activity is of greater importance to some.

**Trend 4: Urbanisation**

**Trend**

In 2014 The Brookings Institution produced a paper on The Rise of Innovation Districts. It confirmed that ‘for 50 years the landscape of innovation has been dominated by places like Silicon Valley, with isolated corporate campuses accessible only by car and with little emphasis on the quality of life or on integrating work, housing and recreation. A new complimentary urban model is now emerging, creating what we and others are calling “innovation districts”. These districts are geographic

---

10 The rise of innovation districts, Katz and Wagner, The Brookings Institution, 2014
areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also physically compact, transit-accessible and technically wired, offering mixed-use housing, office and retail. It is for particular note that they classify anchor institutions as research universities and research-orientated medical hospitals with extensive R&D activity.

A study by Smart Growth America in 2015 evidenced a trend that American companies are moving ‘down town’ more generally.\(^\text{11}\) It showed that the new locations being taken are dramatically more accessible on foot and by using transit systems, with six common themes explaining the move by business. The top four confirmed by businesses were the attraction and retention of talented workers; building brand identity and company culture; supporting creative collaboration; and getting closer to customers and business partners.

**Potential Property Impact**
How cities evolve will be determined by the collective actions of city governments, people and businesses, but as a general principle, cities are becoming more dynamic than ever before and demand for good quality, accessible space within them is likely to continue to increase. Key city centres and key city districts within globally significant research clusters are likely to experience most demand and have most to gain into the future.

**Trend 5: Importance of Digital**

*Trend*
Digital technologies are transforming all industry sectors. 25% of total patent families now being registered relate to digital technologies. Whilst EU based companies lag behind the US and Japan in ICT technological development, the EU has a lot to offer businesses from around the world. Within companies based in the US, more than 20% of US patenting in ICT relies on inventors located offshore and their second strongest patent portfolio location is the EU.\(^\text{12}\)

**Potential Property Impact**
Within the Life Sciences Sector a greater proportion of R&D work is likely be office and dry-lab based, as data exploitation and use of data in analysis and product development becomes ever more important. There is therefore the potential for less wet laboratory space to be needed as a proportion.

---

\(^\text{11}\) Core Values, Why American companies are moving downtown, Smart Growth America, 2015

\(^\text{12}\) EU Industrial R&D Investment Scoreboard, 2017
Trend 6: Outsourcing

Trend
Outsourcing includes non-physical engineering R&D tasks such as designing, simulation, and consultation to specialised firms, along with the outsourcing of laboratory-based experimentation and trials to specialist organisations. It implies factors including improvement in distinct processes, efficiency enhancement, cost advantage, and reduced time-to-market for products.

Experts estimate that the worldwide R&D outsourcing services market for non-physical engineering R&D tasks is to increase at a compound annual growth rate of approximately 8 percent between 2017 and 2021. A 2014 study by PwC suggested that other sectors beyond the pharmaceutical industry may be more mature in R&D outsourcing approaches. In 2015 Clinical Research published a paper advising that due to constant pressure to cut costs there is evidence of increased outsourcing, with Contract Research Organisations (CROs) enhancing their service offerings and an expected growth in the global CRO market from $27 billion in 2014 through to $32.7 billion by 2017. In 2016 a report by Grand View Research suggested that the CRO market is expected to reach $45.2 billion by 2022, with government organisations increasingly now assigning projects to CROs as well as private sector businesses.

Potential Property Impact
Outsourcing means that work can be undertaken in cheaper locations in any particular country and indeed at times overseas. It can mean that laboratories being vacated by large pharmaceutical companies can be re-purposed to provide very cost effective fitted laboratory space. Users of such accommodation can access good quality technical equipment. CROs, particularly, will be able to move into such accommodation and offer their client group very cost-effective services, thus enabling the large pharmaceutical and biotechnology companies opportunity to reduce floor space needs in the most expensive locations.

Trend 7: Productivity gap

Trend
The annual EU Industrial R&D Investment Scoreboard of 2017 guides that even for the top 2,500 R&D spenders in the world, productivity may not be very high. They suggest that in health industries this can be partly explained by the existence of many small biotech companies that have considerable amounts of R&D funding and R&D activity, but little in terms of sales. Since 2013 there has been an ever-widening gap in the health industries between the productivity of the top 10% and the remainder –

13 R&D Outsourcing Services Sector: Worldwide Forecast to 2021, Technavio, 2017

14 R&D Outsourcing in hi-tech industries, A research study, PwC, 2014
although for note productivity of the best companies is now higher than for any other major sector.15

In the health and ICT (Information and Communication Technology) sector groups approximately 60 to 70% of the top performing firms are based in the US. Although China has shown a remarkable economic growth during the last 10 years, Chinese companies continue to have only a small share of top performing firms across all main sectors. This share has not increased during the 10-year period. Within the health industries, specifically, it is interesting to note that it has almost disappeared.16 So productivity is becoming ever greater in the very best places for R&D.

Potential Property Impact
Property providers serving the healthcare R&D sector have a vast range of covenant strength occupiers to let space to. There is likely to be an ongoing presence of R&D intensive biotechnology companies serving the sector that are yet to make profit, although under the open innovation model for product and service development the larger corporates are going to have ongoing desire to work with such organisations. With an ongoing productivity gap of some significance it is likely that the best places for open innovation are going to need to cater for poor profit makers if they are to attract in the companies that make high profits – it is a phenomenon likely to continue indefinitely and where the property industry/governments (central and local) need to develop plans that can accommodate this.

Research trends

Trend 1: Growing importance of collaboration
Trend
At institutional level there is a strong correlation between levels of international collaboration and quality of research. Harvard produces the highest number of collaborative research articles and it is third in the QS Global Rankings of Universities, 2018.

Potential Property impact
The UK has at least eight universities with an average research citation impact more than 80% above the global average and is cited as a desirable global collaboration partner into the future.17 If UK universities continue to be world leading and collaborate extensively then the research excellence is likely to continue to attract businesses to the UK to undertake commercial R&D (as well as for there to be ever

15 EU R&D Industrial R&D Investment Scoreboard, 2017
16 EU R&D Industrial R&D Investment Scoreboard, 2017
17 British Council, Higher Education global trends and emerging opportunities to 2020, 2012
more spin-out businesses developing products and services using the science/technology flowing out of these institutions).

**Trend 2: Growing importance of interdisciplinary work**

*Trend*

Since the mid-1980s, research papers have increasingly cited work outside their own disciplines. Analysis shows that the fraction of paper references that point to work in other disciplines is increasing. The fraction that points to another speciality in the same discipline (for example, a genetics paper pointing to zoology) shows a slight decline.  

*Potential Property impact*

As the importance of inter-disciplinarity grows there may be polarization of research excellence to those locations where there are institutions involved with research excellence in breadth as well as depth. Businesses looking to capitalize on research excellence may find that their needs are best satisfied in the locations where universities and other institutions are strong across a range of disciplines.

---
