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Durham Smart County: an emerging Area of Innovation with an STP at its heart

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1.0 Executive Summary

This paper will trace the development of the North East Technology Park (NETPark) from a campus-based STP, to a "campus plus" STP, to one element in an emerging Area of Innovation: "Durham Smart County". It then details some current experimental thinking around how the transformation from sector-led, technology-push innovation to challenge-led, market-pull innovation could end up transforming and empowering deprived communities: the "Innovation Crowd".

2.0 Context

NETPark is located in County Durham in North East England. An established science park, it has four UK national technology centres (printable electronics, graphene applications, formulations, and healthcare photonics), two UK Catapult Centres (High Value Manufacturing and Satellite Applications), Durham University on site, and a cluster of companies developing high tech products. It is managed by Business Durham, the economic development organisation for County Durham, on behalf of Durham County Council.

3.0 A campus

Durham is a deprived area within the UK context, despite the presence of a world Top 100 university and a highly significant manufacturing sector (20% of its economy), and this is primarily due to the legacy of heavy industries: mining and shipbuilding.

NETPark was set up to provide the missing innovation infrastructure link between invention and manufacturing and has maintained a strict focus on electronics, instrumentation, sensors, etc. It opened in 2004 as a traditional, campus-based STP, on the site of a former hospital, just outside a market town in County Durham, and about 10 miles from Durham City itself. The first two buildings were the Durham University Research Institute and the NETPark Incubator – the campus has expanded significantly since but is still early stage and there is much more land to occupy in the medium to long term.

4.0 "Campus plus"

In 2007, an innovation membership network was launched, a way of connecting science, engineering and technology companies which were located off the Park to the campus, transforming the STP into the focus and heart of a much wider innovation community of companies. Approximately 350 companies were members of this innovation network. This approach has been effective in extending the reach and critical mass of NETPark, catalysing new collaborations and partnerships across a broader sectoral base of companies, at minimal cost.

In addition, in 2008, we launched Project C, the NETPark outreach programme, with the aim of inspiring the next generation of scientists and engineers. Project C interacted with approximately 45,000 people over five years and has now been integrated into the Business Durham outreach programme.

5.0 A 90 degree flip

The current evolution of NETPark started in 2014 with a flip in its focus: from focusing on traditional market sectors (energy, defence, etc.), the decision was taken to focus on a core competence of most companies on site, i.e., they integrated innovative materials into high value products, such as radiation detectors and medical devices. This enabled NETPark to be both broad and focused in terms of attracting new companies. NETPark's ambition to be the global hub for materials integration by 2025 is underpinned by a five point plan: skills, innovation support, property, world-class research, and communications. This has accelerated development, consolidated partnerships, and enabled us to stand out in a crowded market.

Crucially, the flip from sector to core competence at NETPark has unlocked some creative thinking in how innovation is encouraged and managed in County Durham.

We have made a fundamental move - from sector-driven, technology-push innovation to challenge-led, market-pull innovation, which has enabled us to view all of County Durham as an Area of Innovation ("Durham Smart County").

6.0 An emerging Area of Innovation: Durham Smart County

Durham Smart County is the current name of an open innovation process developed by Business Durham to facilitate more private sector economic activity in County Durham.

At its heart is a simple question: why not put our own societal challenges at the heart of our sector development strategies, using those challenges to stimulate high quality economic activity: more products and services developed to solve those challenges which should lead to more funding and investment won, and more companies and more jobs created.

In the much longer term, the more effective solutions that have been developed (and the increase in high quality economic activity) should help solve those challenges and also reduce pressure on stretched public sector budgets.

Durham Smart County has several aims:

- Business capacity: it aims to build capacity in local companies, improving skills and knowledge to win significant investment from both public and private sources, and to attract more economic activity into the County, creating more and better jobs.
- Reputation: it enables us to stand out in a crowded marketplace. In the health sector, for example, most regions talk about "life sciences" but we talk about wanting to be the best in solving the healthcare issues associated with social isolation.
- Inclusivity: rather than innovation being seen as a high tech "shiny lab" process which is nothing to do with "me", it can be seen as a questioning approach that directly relates to seeing opportunities to solve problems that are relevant to all of us.
- Culture change: it helps colleagues within Durham County Council who ordinarily would not see themselves as contributing to economic development to reframe what they do and see opportunities to contribute to long-term economic prosperity, as well as helping communities in the County now.
- Savings: there is a recognition that "business as usual" in a time of shrinking budgets may not be sufficient to achieve the step-change needed in tackling the "wicked problems" of e.g., social isolation, community resilience, obesity, decarbonisation, etc. An open innovation process which collaboratively examines these problems, uncovers the root cause and frames them for market participation may lead to more effective long-term solutions which reduces pressure on budgets. Earlier engagement with other organisations facilitates

improved outputs with a more agile and collaborative commissioning and procurement process, perhaps also delivering efficiency savings.

The Smart County process has developed organically – we formulated the basic premise of using societal challenges to stimulate economic activity and allowed it to develop in collaboration with partners and stakeholders.

We started by working with colleagues in Public Health and asked: what was the underlying cause of multiple health conditions in County Durham? The answer was social isolation. A stakeholder group was created of Durham County Council, Durham University, the Centre for Process Innovation, the National Health Service and Clinical Commissioning Groups. We identified specific health problems related to social isolation: Falls; Infection Control; Chronic Obstructive Pulmonary Disease; Cardiovascular Disease; Mental Health; and Dehydration and Malnutrition.

Via a wide-ranging consultation across government, academia, businesses and communities, we then identified common underlying themes which could catalyse solutions: Innovative Homes, Community Assets and Connectivity, and Innovation in Personal Engagement with Health. We are articulating the opportunity with colleagues in Durham County Council Adults and Social Care and will disseminate this to the market to attract engagement by businesses.

We also used these themes to pilot an outcomes-based procurement process in Durham County Council – essentially using the same frameworks as Innovate UK's Small Business Research Initiative (SBRI), which is the UK's implementation of the EU's pre-commercial procurement model. This was a first for a Local Authority: buying things that did not yet exist to help the private sector develop solutions to challenges does not sit comfortably with existing procedures and it came to be known as the "Magic Beans" project. Three companies were successfully contracted, including a local hospice which has developed a digital platform to alleviate social isolation for people in palliative care – a platform that they aim to export across the palliative care market globally.

Further development work with other colleagues has highlighted that the Smart County process is flexible and can accommodate different stages of development: the critical thing is identifying the root cause that needs to be addressed. We have applied the thinking to other areas:

- Public Health – Obesity. Durham is already a pilot area for a Whole Systems Approach to tackle the complex causes of obesity, undertaken by the Healthy Weight Alliance. The role for Durham Smart County is to ensure the business voice is heard and consulted to maximise the potential for solutions to be developed by local companies. Last year, we introduced an innovation management module into foundation degrees at New College Durham (the first college in the country to do so) and students have chosen obesity for their challenge this year, looking at the behavioural reasons which lead to obesity, and developing solutions, including a videogame that requires players to exercise to progress, and a healthy eating takeaway service along the lines of "Just Eat".
- Space and Satellites. Business Durham is already developing critical mass in the space and satellites sector; managing the North East Centre of Excellence for Satellite Applications, the UK Space Agency Incubation Programme, and the EU Interreg Space and Photonics "STEPHANIE" project. We were able to introduce the Smart County open innovation model very easily into this activity: focusing on a safer world – security of foodchain, infrastructure, transport, etc. The first cycle is focusing on the use of Artificial Intelligence in maritime transport to reduce false alarms. Overall, the programme has enabled companies in the North East to secure £4M of investment and funding in the last year.
- Decarbonisation. This process has just started and we are working with colleagues in the Low Carbon team to identify the societal challenge.

- Community Resilience. Again, this is at a very early stage and we have just started working with the Safer Durham Partnership to identify the societal challenge.

These challenge-led programmes are underpinned by the Durham Smart County process, a systematic application of innovation management principles to solving problems that matter to local communities, using the process as a lens to focus private sector activity to upskill companies and attract new companies. This is a fundamental shift, linking economic development activity directly to solving local problems and using those "problems" as a way to stimulate more innovative activity in the area, more jobs and more companies.

It should be a virtuous cycle: using problems to stimulate more high value economic activity should start solving those problems but more high value economic activity should, in the long term, also go some way to prevent these problems occurring, particularly in health, and so deliver a more prosperous County Durham.

7.0 Lessons learned

It is fair to say that this is still work in progress. In our context, a leap to an Area of Innovation, without an STP, would have been too far too fast. It was, and is, necessary to have NETPark as a very visible symbol of innovation and the development of products and services with high social impact. It was necessary to develop the basic innovation support infrastructure and ecosystem and networks which could then be developed and animated by a new, challenge-led approach.

Smart County is intended to bring about a step change in innovation and economic development in the long term: while it is still quite early stage we have highlighted some initial findings below.

Reputation - our adoption of the open innovation process has generated significant interest from influential stakeholders such as Innovate UK, Catapults, etc., and positioned Durham as a place that is prepared to be innovative, and even take risks, to facilitate economic development outcomes.

Culture change and savings - colleagues in Durham County Council were very supportive of implementing the process as a pilot to shift to a more outcomes-based procurement model. Anecdotally, colleagues within Durham County Council have welcomed this approach: the Head of Commissioning commented that the Business Durham perspective was like putting a new lens on finding new solutions to longstanding problems. This has led to early stage thinking about how other activity within the Council might be reframed in a similar fashion to ensure that opportunities for economic development are considered, e.g., grants secured.

Inclusivity - the focus on a collaborative approach is leading to a more embedded, opportunity-led approach to innovation across Business Durham, helping us to articulate a clearer, more inclusive message about how we support businesses to innovate:

- Day to day business engagement, helping individual businesses to spot opportunities to develop new products and services, and access new markets and export opportunities.
- Programme management, ensuring that opportunities from large-scale projects such as H2020, CERN and the European Extremely Large Telescope are promoted to businesses so they can position themselves to engage appropriately.
- Building long-term resilience, such as scoping out the opportunities and threats of Industry 4.0 and designing interventions where appropriate.
- An open innovation programme (Smart County) which places societal challenges at the heart of local government economic development activity, reframing so-called problems as

real market opportunities to catalyse the development of new ideas, and the creation of new products, services, and business models, catalysing more start-ups and scale-ups and building resilience.

In the last year, we have realised how important this inclusivity is – and how we should be much more inclusive in who can participate in the innovation process. This is called the "Innovation Crowd".

8.0 An innovation crowd

England still has some of the most deprived communities in Europe, with systemic challenges crying out for new solutions, yet these communities are usually completely disconnected from the UK's world-class innovation assets, ecosystems and policymakers. It seems that 'innovation' and 'technology' are often conflated: the emphasis on the commercialisation of technology in current innovation policy has resulted in a perception that innovation only happens in 'shiny labs' and can only be participated in if you have a science degree. This excludes large segments of society, when the reality is that innovation is a problem-solving process that anyone can participate in.

The Durham Smart County approach has allowed us to be inclusive in a way that was not possible in the past: being specific that local problems can be solved collectively and locally has unleashed a wave of enthusiasm, and has empowered new participants in the quadruple helix and we are now extending the Smart County process to stimulate participation from a radically enlarged innovation ecosystem for co-creation. We believe that this approach that could accelerate demand for new and more effective products and services that are then brought more successfully to market – we outline our development approach below.

We are calling this the "Innovation Crowd: a Grand Challenge for Space in 2019": we want to transform the traditional innovation triple helix of academia, business and government into a flexible innovation network (or web or "crowd") which is welcoming to all participants who have something to offer, regardless of background. Just as crowdfunding has opened up investing to millions who would never consider the financial markets, and just as Air BnB (for example) has enabled millions of people to become accommodation entrepreneurs, we need to find a way to empower people to participate in the innovation process so society can benefit from their ideas, their talent and their creativity.

The logic model is that wider participation in the innovation process equals better defined outcomes, equals more and better potential solutions, equals opportunities to generate more sustainable economic development outcomes, equals influence in future innovation policy. It will:

- Uncover or reframe problems or needs that innovation could address
- Identify priorities or challenges for innovation policy
- Decide how funds should be spent
- Influence the way that new technologies are developed, used or regulated
- Devise sets of principles to guide policymakers' decisions

This could be highly influential on future innovation policymaking in terms of our understanding of what innovation is and how to encourage participation in it. We have taken on board the recommendations in Nesta's report: "Health as a Social Movement" and intend to apply them to participation in innovation:

- Kickstarting action: identify the early adopters and generate early success, engaging the right people at the right time so that the space sector, and our approach to driving more activity, becomes increasingly influential.
- Nurturing diverse voices: people with lived experience, knowledge pioneers, domain experts, spokespeople and institutional supporters are all necessary for collective action.
- Influencing and interacting: establishing and facilitating the complex web of relationships needed to deliver the outcomes

To turn this into reality, we intend to pilot small challenge spaces to test the idea in 2018, building to a grassroots 'Year of Space' in 2019 where the Innovation Crowd will tackle a global challenge and collaborate to solve it using space technology and satellite data. We have selected the space sector as it is inherently inspirational and the North East has attracted a critical mass of programmes to develop the sector in the region, funded by Interreg, the Satellite Applications Catapult and the UK Space Agency. It would seem an appropriate choice to pilot this approach.

As outlined above, we have already started to develop a challenge-led innovation approach that puts systemic societal challenges, problems that are relevant, visible and meaningful to communities, at the heart of the innovation process and space sector development. The theme for the North East Centre of Excellence for Satellite Applications is not some abstract concept, such as logistics or cybersecurity but, simply, "Satellites for a Safer World". We are now in the process of:

- Examining new methods of encouraging engagement and participation in innovation, perhaps through unexpected routes, such as art and culture, community champions, etc., and how we maximise existing methods, such as outreach.
- Developing language and communications: the current language and messaging needs to be developed to ensure that it is inclusive of, and welcoming to, all potential participants.
- Articulating how the challenge-led approach works in practice: how do we involve communities, academia, government, and business as equal partners in the process and ensure that appropriate support is available to develop ideas into products and solutions? What are the measurable outcomes?
- Developing processes and project plan to manage and facilitate this enlarged innovation ecosystem effectively to ensure that the Innovation Crowd is delivering to the outcomes.

Essentially we are creating a roadmap that will lead to a tested scalable model:

- Identification of quick wins, building on existing capabilities, and immediate projects that could secure investment to gain early momentum.
- Problems scoped and framed as innovation challenges, with an appropriate innovation scorecard
- The essential stakeholders in realising this model mapped and initially engaged.
- The wider community and innovation ecosystem mapped.
- A clear statement and action plan as to how the implementation of the model will be managed and delivered to stimulate private sector activity and economic opportunity on a rolling open innovation basis.
- Impact on quality of life outlined for communities in the wider North East
- The widening of public support in the North East for innovation with appropriate messages scoped and tested.

While over 70 organisations have been involved in the development of thinking so far, we intend to convene a small group of core partners: Sunderland Culture, Northern Heartlands, National Innovation Centre for Ageing, International Centre for Life, Institute of Physics, and New College

Durham, given these organisations' track record for effectively engaging with diverse audiences and the wider communities.

Initially we will undertake some rapid, broad-ranging perception research with stakeholders, businesses and communities around opportunities, uses, and issues to validate and prioritise possible thematic areas in which to apply space technology and satellite data. We would then develop an innovation scorecard, adapted from our previous experience in challenge-led health sector development to assess and triage ideas.

Once the thematic areas are prioritised, the core partners will convene the relevant actors to frame the challenge and how outcomes might be measured, feeding into innovation scorecard to ensure that challenges are framed in a consistent way.

Once the challenges are framed, core partners will facilitate a challenge space for interested parties to generate ideas and solutions. The challenge spaces will be designed to be spaces where everyone can participate in solving our biggest problems: informal social interaction encouraging participants to play with and find uses for satellite data. They will be staffed by experienced innovation practitioners who can help groups of people to frame problems, business support experts who can advise on funding and IP, STEM Ambassadors, satellite experts from government, business and academia, and artists and community practitioners who are experienced in uncovering untapped creativity in people from all walks of life. These people will be recruited via an open call where appropriate.

Each core partner will maintain communications and consultation for the thematic areas, drawing together and communicating the findings and adjusting activity as necessary. Mechanisms such as private Facebook page will be set up to collate findings and learnings, and to track progress of projects generated through the workshops, connecting them to support and guidance from other partners in the existing North East innovation system. Evaluation and dissemination will be guided by the outcomes but flexible enough to absorb unexpected learnings that are uncovered during the process. The learnings from this testing process will then guide the development of the Year of Space Innovation Crowd Grand Challenge in 2019.

The outcome of this concept is more economic activity stimulated by innovation:

- More, and more successful, products and services launched locally and then exported
- More high value jobs
- More companies diversifying into the space sector
- More companies starting up in the space sector
- More demand for local and national supply chain activity

We believe that the proposed approach will lead to a transformation in local communities, catalysed by interaction with, and participation in, innovation. New ways of accessing data and better access to high quality information and innovative technologies can empower communities to make better choices and take action, building resilience and agency. It also significantly widens the pool from which talent can be inspired and encouraged: either to start up businesses, or to develop an innovation mindset, with SMEs able to employ people of all ages who have already developed an inherently innovative approach.

Conclusion

While much of this is experimental and in development, we have already seen the impact that taking a challenge-led approach has had. It has allowed us to become sector agnostic and, once

again, stand out from the crowd by dropping mentions of typical sectors. In essence, we are planting a flag for people to rally around, no matter what sector or background, and work together to develop fundamentally new solutions to what were thought of as intractable problems. At the heart of this thinking is our manifesto: “We believe in the potential of people to transform challenges into opportunities to succeed.”