Science Parks Without Walls

Catalysts for Knowledge Economy led Urban Regeneration

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Originally a PhD microbiologist, his academic research interests were directed towards the application of microbes to clean technology which led on to him co-founding a start-up biotech venture based on the application of biocatalysts to the paper industry. This experience developed into a wider interest in the translation of science into good and applicable technologies and creating appropriate partnerships and infrastructures to promote the development of knowledge-based businesses across a range of sectors.

David spent 10 years in Cambridge (UK) helping to develop the Biomedical Babraham Research Campus. In 2008 he moved to Birmingham Science Park Aston and has led the implementation of a new strategy building on the park's pedigree as the 3rd oldest science park in the UK. The strategy embraces opportunities offered by the latest ICT collaboration platforms to access global support to drive Birmingham's knowledge economy. David was awarded an MBE for services to science in 2009.

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Anne has over 15 years of global experience in the public and private sector. She started her career at the French Prime Minister's office as head of the department responsible for funding and managing state-owned broadcasting companies. She joined Thomson, a high-tech champion in 1998 as a strategic planning manager and built up a strategy for promoting a new generation of consumer electronics devices. Shortly after, she created the new position of General Manager for e-business and took part to Thomson strategic move towards internet-based services.

Anne joined Cisco in 2004, Anne has been alternatively based in France and Silicon Valley. She works as a trusted advisor to senior levels of large public sector organizations and has developed new public / private partnerships likely to sustain growth and economic development. Anne graduated from Sciences Po and ENA (National School of Administration), the most prestigious programs in France for CXOs and politicians.

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INTRODUCTION

As the world struggles to emerge from economic recession, national, regional and local governments are seeking cost-effective ways to stimulate growth, wealth and job creation. Within the UK, in addition to the recession, changes to the political landscape led to the removal of regional development agencies and several layers of public business support initiatives. This provides the UK with a chance to reconsider the relative merits of such offerings so that before we re-populate the landscape with initiatives designed to aid the economic recovery, we ask 'were the culled offerings truly fit-for-purpose to the extent that they should be revived under a new guise?' The re-creators need to consider whether they are reviving activities that were at the top of the evolutionary tree, or were in fact more akin to dinosaurs; magnificent beasts that had their time, but are no longer fit for purpose. Just because business support initiatives appeared to work in the last decade, does not mean the same practices will deliver what is needed now or in the future; in today's economy can local or indeed national initiatives generate sufficient impetus without looking to global mechanisms?

Geographic clusters around the world are held up as models to be copied to fuel knowledge-economy led regeneration; and universally Silicon Valley is seen as *the* exemplar. The very scale of The Valley is likely (though I would suggest not guarantee) to perpetuate its success for the foreseeable future but is it a model that can or needs to be recreated around the world? In tomorrow's world will geographic clusters be such powerful engines of growth?

The Clusters that evolved during 20th Century have been centres of excellence based around geographically compact entities promoting innovation and entrepreneurialism. Such geographies promote knowledge-based companies as they tend to conduct their business as networked rather than vertically integrated entities. Physical proximity promotes regular face-to-face contact enabling tactical and strategic alliances and continuously evolving business plans.

Successful geographic clusters create, retain and support a self-renewing critical mass, famously exemplified by Silicon Valley and within the UK, the Cambridge IT and Biotech cluster. These dynamic innovation ecologies, 'technopoles', evolve as key players change the underlying characteristics of the location and hence the relative competitiveness of a region. The effectiveness of the region's ability to manage and develop its *Intellectual Capital* (a measure of assets related to knowledge creation):

- *Social Capital*: The professional support environment;
- *Human Capital*: Entrepreneurs, innovators and CEOs and FDs experienced in technology translation;
- *Organisational Capital*: The physical infrastructure - of innovation centres, incubators and science parks;
- *Financial Capital*: Public and private sector funding;
- *Technology Capital*: The combined industrial and academic knowledge generation capability.

History of course highlights the fact that clustering is not just a 20th Century phenomenon; human kind has clustered to gain advantage ever since the nomadic tribes adapted their ways to harness nature and created settled communities. In modern times the inventions behind the Industrial Revolution led to manufacturing clusters that resulted in the growth of cities like Birmingham (UK) as they became the 'workshops of the world'. Birmingham was the 18th and 19th Century super cluster, arguable in economic terms the Silicon Valley of its day. However, as one or more of the functional "Capital" units weakens then the cluster is threatened. As old industries are superseded, or move to other parts of the now global economy new competencies need to be incorporated into the mix to sustain momentum. To survive as an 'entity' the economic clusters themselves must innovate to continue to provide the cohesion that maintains the reason for the location.

The scale of the Silicon Valley model sets it apart from any other technology cluster, although the building blocks of a university and government and private sector funding with the whole mix driven by key entrepreneurs is the same in the Valley as elsewhere. Cambridge (UK), whilst not on the same scale today was similarly the consequence of the same components. An 800 year old world class university represented the nucleus around which the "Cambridge Phenomenon" was generated, a product of time, based on foundations built over 40 years. No one group organised or indeed

organises Cambridge; it was not directed, it evolved as a consequence of constructive chaos. New initiatives, often led by individuals, spring up some succeed, some fail, but it is the basis for the highly entrepreneurial environment. The 1970's saw the start of the phenomenon with growth of firms specialising in information technology especially computer-aided design and at that time the university adopted a laissez-faire approach, which did not prescribe what an academic could or should do and there was a relaxed view on intellectual property rights. The most entrepreneurial academics actively pursued commercialisation of their research findings in a new environment that promoted technology transfer through venture and loan finance.[1]

Silicon Valley and Cambridge (UK) were the result of a set of circumstances, they grew organically, not driven by edict or any single strategy. This suggests that it is a phenomenon that cannot be readily replicated elsewhere as a consequence of government directives. The scale difference between Silicon Valley and Cambridge and indeed any other clusters, is in its self phenomenal. In part this a consequence of time scales; Silicon Valley's history stretching back 60 years with Stanford alumni founding high-tech startup companies in the region surrounding the university over a comparable period of 40 years to that seen in Cambridge. But two other important differences contribute to the difference: The quantum of early stage capital is so much greater in the Valley, such that senior management can spend more time developing the business than raising repeated rounds of (diluting) funding. Secondly, the entrepreneurial culture in the USA accepts failure as a learning experience so much more readily than the UK and Europe.

The Triple Helix IX conference looks to assess the Silicon Valley experience in terms of it being a model to be rolled out globally or to accept that is a one-off anomaly; a consequence of a unique set of circumstances set a unique point in time. Birmingham, UK, is far from atypical, around the world cities based on old economies now face economic crisis, so what elements of the Silicon Valley model hold true today as a catalyst for much needed regeneration through knowledge industry-based economic diversification? Can future generations of companies achieve their potential whilst confined within artificial geographic or administrative boundaries when the innovation chains are so dispersed and complex such that increasingly they cannot all be co-located, will any single geography be able to provide all that is needed?

The past success of geographic clusters was a function of complete innovation ecologies; if the boundaries encompassed complete ecologies then the clusters were successful. Where component parts of the Intellectual Capital did not attain criticality, or as a consequence of change critical mass was lost, the clusters did not ignite or lost their potency. In the coming decades we would argue that no geographic cluster will be able to be complete without connection to other geographies.

At the heart of most of today's clusters there are science or technology parks which have stimulated and accelerated innovation through agglomeration of talent, technology and finance creating knowledge-based communities operating within a geographic location. We would propose that the science park model needs to evolve if parks, and for parks read clusters, are to continue to calatayse the new economies. Three fundamental shifts in thinking are required:

> From geography-based to community driven
> From Local innovation to borderless innovation
> From technology-driven to technology enabled.

This thinking has led Birmingham Science Park Aston (BSPA) to develop a new strategy as it acts as a much needed catalyst of economic diversification in the Birmingham city region. We will utilise this thinking to exemplify the concepts of the **Science Parks Without Walls**, and how such an approach can act as a catalyst for knowledge economy led urban regeneration as it virtualises cluster thinking by connecting real estate.

BIRMINGHAM (UK)

Birmingham lays claim to being the UK's second city, with a population of 4.3 million working-age people within a one hour commute there are 42,000 companies contributing to a regional budget of £94 billion. Within a four hour travel radius 90 per cent of the UK market - consumer and business – can be reached. This strength derives from the time of the Industrial Revolution when, the local population's keenness for experimentation and innovation resulted in a wide variety of trades being

established. Birmingham became known as the 'city of a thousand trades', the Workshop of the World. Thousands of small firms created employment and the city region was characterised by partnerships of firms, frequently forming a supply chain where one place to made a rough article and

another took the article and finished it for a particular use. The geographic location promoted expansion as industry spilled out of the city centre along the main communications routes – the canals, railways and main roads. It is interesting to note that in common with today's clusters, this manufacturing cluster was also largely driven by key individuals. Not in this instance from the university sector, but by polymaths, pioneering engineers, industrialists and entrepreneurs. These leading thinkers came together over dinner, lit by the full moon, under the guise of the Lunar Society, and included 'Lunarmen' such as Mathew Boulton, James Watt, William Murdock, Erasmus Darwin, Joseph Priestley and Josiah Wedgewood.

Boulton, Watt and Murdock
(Statue on Broad Street Birmingham UK)
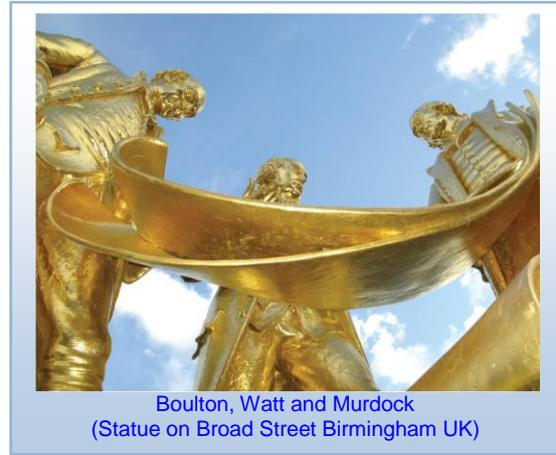
Birmingham's industry was also resilient and adaptable such that when one trade fell off another developed. This flexibility must have been derived from the basic manufacturing skill sets in the work-force; the skills of the gun maker and sewing machine manufacturer were readily put to use in bicycle manufacture and subsequently into automobile production.[2] During the 18th, 19th and a significant part of the 20th Centuries Birmingham's engineering and manufacturing base has represented a major contributor to the UK economies.

In recent years the challenge of decline in manufacturing in the West has seen Birmingham's economy start to struggle. During the 1970's over 50% of the employment in Birmingham was in manufacturing; today at around 10.6% it is only equivalent to the UK average. Precision engineering and manufacture remains crucial in the region and indeed the resurgence of Jaguar Landrover and the interest in low-carbon transport is leading to renewed opportunities for the region's engineering base.

The knowledge economy is seen as the means of moving the UK out of recession. This obviously includes high-tech precision engineering and manufacture, the application of which is exemplified in the 21st Century automotive industries in the Birmingham city region. However, in May 2011 with unemployment of 11.8% compared to a UK average of 5.2%, with only Liverpool in a weaker position amongst the core UK cities, the factor of skills and entrepreneurialism is again at the forefront of concerns over economic recovery.

Birmingham is the main city in the West Midlands a region that extends over 5,020 sq miles and whilst the city dominates the rural environment, it is of note that almost 90% of the region is 'green space'. The population in 2006 was 5.4 million with a GVA of £16,583, which compares to a national average of £19,082, placing the region 6th out of the 9 UK regions.

A recent analysis by Professor Mark Hart[3] highlights some of the issues faced:

▶ Both business birth and death rates in the West Midlands increased in the 10 years to 2008. In 2008 there were 110,770 firms in the private sector in the West Midlands employing 1.61 million people, an increase in the business stock of ~ 20 per cent.

▶ The job creation/destruction rates reveal that 30% of all jobs in the private sector were either destroyed or created over an average 12 month period in the West Midlands economy. On average each year:

  ▶ On average 111,000 jobs (UK=973,000) were created through firm entry and 131,000 jobs (UK=1.3 million) were lost each year through firm closure;

- 133,000 jobs (UK=1.8 million) were created through the expansion of existing firms and contraction led to the loss of a further 106,000 jobs (UK=1.2 million);

- This equates to around 481,000 jobs in the West Midlands economy (9% of UK total) being created, destroyed or reallocated each year.

The job creation/destruction counts also hide another trend within the region, the loss of private sector jobs and an increase in Public sector employment[3]. As in many places the Birmingham business start-up story is one of increasing numbers of micro-enterprises that do not readily grow to become major employers; the region also has a lower survival rate than the UK average (52% of

Public and private sector jobs creation (1998-2008)		
Local enterprise partnership	Job creation (1998-2008)	
Public and private sector job creation	Private sector	Public sec
2 Solent LEP	57,400	15,200
1 Bristol	49,200	30,600
8 Leeds	41,600	67,200
7 Manchester	36,400	56,800
6 Newcastle and Gateshead	21,300	28,900
3 Leicester and Leicestershire	3,600	21,600
10 Liverpool	-2,700	37,900
9 Sheffield	-2,700	53,800
4 Nottingham(shire) and Derby(shire)	-5,100	46,900
5 Birmingham and Solihull	-23,400	57,500

start-ups survive 3 years compared to 57% across the UK).

In economic policy terms high-growth firms (HGFs) are expected to play a major role in increasing employment as the economy emerges from the current downturn. The OECD defines such as firms those with a minimum of ten employees at the beginning of a three-year period that achieve an average annualised employment growth greater than 20 per cent over that period. Analysis across the UK suggests only 6% of UK firms meet the high-growth definition. The trick of course is to identify those with high growth potential and support them, but in reality we do not really know much about how businesses grow in the UK.

Government Office Region (GOR)	2002-05		2005-08	
	No. of High Growth Firms	% of all Firms (10+ emps)	No. of High Growth Firms	% of all Firms (10+ emps)
East Midlands	740	5.7	720	5.1
East of England	979	5.8	1,025	5.6
Greater London	2,103	**7.5**	2,219	**6.9**
North East	357	6.2	389	**6.1**
Northern Ireland	364	**6.5**	303	4.6
North West	1,151	6.1	1,199	5.5
Scotland	830	6.3	1,030	**7.0**
South East	1,583	6.2	1,689	**5.9**
South West	883	6.2	900	5.6
Wales	596	**9.1**	335	4.8
West Midlands	904	5.6	851	4.8
Yorkshire & Humberside	879	6.1	870	5.3
United Kingdom	**11,369**	**6.3**	**11,530**	**5.8**

Ref 3

Within the West Midlands the ~900 HGFs created 84,000 new jobs in three years from 2005-08 – a rate of net job creation three times greater than other more modestly growing firms in the region.

For the knowledge economy to thrive the appropriate skill sets need to be available. The relative percentage of residents employed as knowledge workers (managers and senior officials, in professional occupations or in associated professional and technical occupations) is a good indicator of how well a place is adapting to the knowledge economy. For the Birmingham region an analysis of the skills sets available is not encouraging. The thematic state of the region report 'The West Midlands' Knowledge Economy' produced by the West Midlands Observatory (August 2009) noted that 50% of staff working in the region's public sector organisations were qualified to degree level or above but in contrast, less than 24% of those working in private sector industries in the region had higher level skills and qualifications in 2007 - well below the England average of 28%. This reflects both the region's historical reliance on low productive sectors and its relatively poor record in attracting knowledge intensive international businesses and indeed the recent focus on public sector employment in the region.

Moves to attract new high value added businesses and highly skilled workers to the region are key to development of the region's knowledge economy. As noted by the Regional Observatory it is critical to ensure that firms have the capability to effectively harness and deploy the skills and technologies available to them. The local management needs to drive deployment of ICT, promote and invest in innovation and ensure effective deployment of appropriate workforce skills. However, overall the skills and capabilities of leaders and managers in the West Midlands tend to lag behind many other regions. They are less well qualified, 6% managers and leaders (compared with 5% nationally) have no formal qualifications. This again reflects the economic and social history of the region, but at a time when the knowledge economy is the driver of recovery the shortage of relevant skills and competencies is placing Birmingham at a competitive disadvantage.

An analysis of Birmingham's Intellectual Capital identifies weaknesses in many of the necessary components. The region's entrepreneurial activity places it 3rd in the country but the positive attitudes towards entrepreneurship do not translate into high levels of business start-ups. Regional data suggests that 80% of the output gap is caused by low levels of enterprise and innovation, low skills levels and low investment in infrastructure.

The UK Political landscape

In 2008 the UK's Technology Strategy Board's own strategy[4] identified the need to "simplify and streamline" innovation support mechanisms. "Innovation Nation"[5] a government White Paper produced by the then Department for Innovation, Universities and Skills (DIUS) called for standardization of vital components of the innovation system. The latter also suggested "*innovation often does not obey artificial administrative boundaries*" and proposed that the "*challenge is to create a framework at national and regional levels where activities to support innovation are focused in cooperation between different the actors involved, are responsive to different places and spatial levels and work across administrative boundaries*". This was followed by a report entitled "Race to the Top"[6] in which the then regional administrative bodies, the Regional Development Agencies (RDAs) were tasked with leading economic development by promoting a regional dimension to the national economic performance. This approach led to the UK innovation "lake" being divided into RDA "ponds" that [often] could not support complete knowledge-economy ecosystems.

The change of government in 2010 led to the closure of the nine Regional Development Agencies and the establishment of more than twenty Local Enterprise Partnerships (LEPs). Such new administrative boundaries have the potential to divide the ponds into "puddles"; in puddles, whole ecologies are unlikely to be sustainable. At the same time came a change to the innovation support mechanism from one that had been driven at a local or sub-national level to one that is going to be driven from a national level from the Department of Business Innovation and Skills (BIS). The danger now is that this will create a disconnect by dismantling RDA-based enterprise support activities and regional seed and early stage funds, and replacing them with a centralised offering separates these functions from the point of delivery. The direction indicated by a recent Government White Paper[7] provides opportunities for science parks to again play a pivotal catalytic role.

Post the 'Perfect Storm'

In economic terms, the latest wave of disruption for Birmingham, indeed globally, was wrought by the recession. But the changes were already happening; the regional economy was in decline well before the events of 2008. There is however, another second wave on the way, a tsunami, in the form of the fast-moving connected digital world, which, with a low-skilled employment base, threatens the local economy to a greater extent than anything that as gone before. Birmingham needs to embrace the digital agenda, seeing it as an opportunity deriving from the Perfect Storm. The new state of 'normality' will be drive by the need to address:

- greater efficiency and productivity at lower cost
- delivery of a faster rate of change in a 'connected' world
- reduced environmental impact
- the new aspirations of the 'Y generation' and 'Millennials'
- [and consequently] the renewed importance of cities as drivers of the economy

Cities like Birmingham need to set their ambitions in a global context creating new fit-for-purpose infrastructures, harnessing the best players. If they are local, fine, but otherwise we need to expand our horizons as we recognise our shortcomings. Fledgling start-up businesses need to connect with like-minded people, public and private sector bodies with gaps in knowledge, talent or funding filled from the global ocean not lakes, ponds or puddles. Captains of the old industries, or their successors, still lead the modern manufacturing economy in Birmingham today. They are though not generally versed in the new economies and too few of the old skill-sets readily translate into knowledge-economy businesses and in order to drive 21st Century growth. Birmingham could wait for the natural selection of geographic cluster dynamics to take effect, aggregating the relevant expertise and experience over a 20-30 year time scale. But in the 'new normal', the tsunami will bring destruction before the defences can be created so Birmingham and other such cities must look beyond their geographies and develop global partnerships to drive economic diversification and new growth.

The importance of "New Century Cities" in tomorrow's economy is expressed widely and is translating into the establishment of Knowledge Quarters in cities around the world. However, such economic regeneration is hampered by an inability to access knowledge economy competences in cities with old-economy-derived expertise and experience. A recent analysis of European cities[8] suggests that there is no single common policy formula that can catalyse such economies but that it is essential to understand and build upon historic place-specific characteristics and resources that impart distinctiveness to each city. In particular to build on the legacies of 'pathways' – a city's role as a national or regional city or as a centre of higher education; 'places' - exploit city and city-region characteristics and 'personal networks' - recognise personal networks influence individual, family and business location decisions. The importance of city-regions was also highlighted by the Centre for Cities[9], by proposing *"Cities' real economic footprints go beyond their administrative boundaries. By local authorities and businesses working together on issues such as skills, housing and transport they can achieve better outcomes."* The economic inter-dependencies, highlights the need to overcome old tensions between cities, cities and their suburbs, or indeed between urban and rural areas. It is clear today as in Birmingham's history, that there are mutually important commuting and supply chain links between the different geographies. Administrative boundaries must not limit real economic areas; Centre for Cities suggest that there is a need to reduce "*fragmentation and duplication – across any area there are a multitude of local government, business support organisations and quangos all involved in economic development policy-making and delivery.*"

A new generation of industries will drive the economic recovery over the next decade, fuelled by long-term changes in technology, society and geopolitics. The recession was not only a point of change, many argue that it has acted as a catalyst for growth. As the business landscape alters, we will see the emergence of new ways of doing business in an increasingly interconnected world. *'Industrial life is at a tipping point,'* believes Dr Lynda Gratton of the London Business School. *'We are seeing a fundamental shift from the individual to the connected, from the generalist to the specialist, and from a simple desire for money to a focus on experience,'* she says. *'Over the next decade, people will have to adapt abruptly.*[10]

'People have got to get out of their silos and work together,' states Robin Wight, instigator of the Ideas Foundation, a charity that nurtures young, creative talent. '*A new generation of renaissance communicators will be multi-skilled and multi-disciplined,'* he observes.

Traditionally science parks are seen to stimulate and accelerate innovation through agglomeration of talent, technology and finance creating knowledge-based communities operating within a geographic location. Linking this into the New Century Cities agenda points to the value of locating science parks in urban Knowledge Quarters and integrating them into regeneration programmes to provide impetus by promoting innovative creativity. The creative economic ecosystem thus created promotes new ways of doing business; supporting the "Collaborateers"[10] a new breed of entrepreneur delivering through an agile, collaborative and opportunistic approach to business.

Blending city-centric lifestyles and choices with environmental drivers and the digital economy plays to the aspirations of today's *'Y-Generation'* as they establish their first businesses and will become increasingly the norm as the 'Millennials' come of age. The commercial venture of the future will be hyper-connected, flexible companies with an international footloose ethos – the "Micro-multinationals."[10] Virtual technology enables entrepreneurs to link up with talent around the world. Dr

Lynda Gratton of the London Business School believes that *'As a result, leadership will increasingly emphasise the management of networks and eco-systems of talent, rather than just permanent employees,'*

Science Parks Without Walls (SPWW) – promoting clusters without boundaries

In many parts of the world it appears that science parks do not achieve their full potential in terms of direct impact on GDP. We would argue that at least in part this is because few science parks have exploited the whole opportunity offered by global exchange in terms of collaboration, partnerships, and resource sharing. Distance, physical boundaries and cultural differences, have prevented them from developing powerful and sustainable alliances. Interestingly, most industrial sites located within cluster zones have regarded technology as an industry to be attracted or supported, rather than as a catalyst for their own innovation and growth.

Open to global opportunities, free of geographic restrictions, the virtual clusters and associated next generation of science parks will better embrace the full potential of collaboration between public, private, academic partners. It is our belief that in order to embrace the needs of the entrepreneurs of the future the clusters and associated science park models need to evolve. This introduces a new paradigm involving three fundamental shifts in the thinking behind parks[11]:

> - *From geography-based to community-driven entities:* Instead of viewing science parks as defined geographies, they will be characterized as digital communities of interest where coherence is generated through intellectual proximity rather than just geographic proximity.
> - *From locally processed innovation to open, borderless innovation:* the "wisdom of crowds" elevates relevant new ideas to wider relevant audiences. These community interactions reveal areas of mutual interest that otherwise would not have been identified, so promoting greater uptake of innovative new partnerships to stimulate and accelerate economic growth and wealth creation.
> - *From technology-driven to technology-enabled spaces:* Intelligent and connected buildings, digital collaboration platforms and cloud computing can dramatically change the working space and bring both innovation and productivity gains.

Catalysing economic growth will be increasingly reliant on the fast pace of the digital world, which in turn this means that:

> - The availability, quality and efficiency of the web infrastructure will determine the strength of digital communities;
> - the strength of digital communities will determine the pace of innovation;
> - the pace of innovation will determine the effectiveness of the 'place'.

Centres of creativity driven by a *sense* of belonging, a *sense* of 'place' actually represent an opportunity for cities like Birmingham to be innovative in terms of the business support offering. It would enable them to embrace the new economies by condensing time-frames involved in establishing clusters, previously measured in decades, to regeneration-relevant, indeed politically-relevant, timescales measured in years. By importing knowledge-economy competences utilising the latest communications platforms old economies can access the best, not just local, resources; people with ideas, experience and expertise and funds to invest, to drive economic diversification and regeneration.

In regional development terms virtualizing businesses goes against the usual measures of successful interventions in that job creation in a given location is not what the virtual cluster approach secures. That said, if the successful businesses of the future are going to be 'Micro-multinationals', the impact of intervention policies should be measured by their effect on wealth, not job, creation; based on the general principal that capturing the founders secures the new wealth for the region. National and regional governments that continue to focus on job creation will not create the sorts of environments that secure high value jobs in knowledge economies; they will instead gravitate to the forward thinking connected New Century Cities. In Europe this is exacerbated by the paucity of early stage funding and the drip-feed approach to investment.

Practically speaking, we advocate the creation of Innovation Centers and **Science Parks**, playing the role of convivial epicenters **Without Walls**. Such locations will welcome the physical community in a creative environment and connect it, virtually, to the rest of the world. By hybridizing the two 'places' these centers ideally should encapsulate, promote and represent:

- Virtual communities where members have a common interest in the translation of high-tech ideas into investment-ready high-growth ventures;
- Showcases for autonomous work environments for flexible and remote working;
- Flexible and highly networked permanent work space to enable networked enterprises to flourish, including collaboration platforms;
- High quality networking, conference and meeting rooms and drop-in facilities;
- Quality catering outlets;
- Provide a proactive gateway to all HEIs in the region and beyond;
- Provide links to the incubators with full business mentoring services;
- Provide access to equity finance;
- Promote a network of linked science parks and innovation centres across the regions and beyond; hubs providing and accessing resources beyond their geographic boundaries via web connectivity.

A network of science parks without walls generates a global technopole exploiting the full potential of collaboration between public, private and academic partners. It enables entrepreneurs to more readily access global partners and investors, extending their reach beyond current geographic boundaries, typically limited within a 20-50 mile radius. Science Parks Without Walls thus promote future economic growth through sophisticated, efficient and innovative collaboration and enable geographic technopoles to enhance inherently weak elements in their ecologies to promote future growth.

The SPWW embraces the consequences of social evolution such that the true potential of modern ICT collaboration platforms can be exploited because the entrepreneurs of the future fully embrace the virtual world in all aspects of their lives. With such approaches geography need not be the overriding factor for a successful cluster. Indeed the ability to collaborate to create a comparative advantage irrespective of where they are located.[11]

The connected real estate approach is now being delivered in Birmingham by BSPA. The SPWW initiative, in association with Cisco's "Global Exchange for Growth" (GXG), represents an on-the-ground exemplification of the application of these new collaboration tools. The GXG, initiated by Cisco with participation by Barcelona, Birmingham (England), Chicago, Dubai, Montreal, Paris, San Francisco, St. Louis, and Toronto, is a network of governments and entrepreneurs that opens new possibilities for experimentation, co-creation, and sharing. It recognizes that although cultures cannot be transplanted, ideas and strategies from one part of the world can stimulate innovations in other regions.[12] Core to the SPWW is the collaboration with Cisco, JANET (the UK's education and research network) and the University of Warwick, that has provided a cost-effective, affordable way of offering the Cisco TelePresence[TM] experience to the start-up and SME community, previously largely confined to the blue-chip multinationals. The systems have also been cloaked behind security protocols for obvious reasons but in order to maximise the opportunity more open protocols are being developed via appropriate 'bridges' to enable wider access.

The SPWW plans require linkages to like-minded centres, ones looking for global reach to promote borderless innovation. This web of connectivity can then bring the best together, utilising the power of social networks whilst controlling the inherent randomness of such exchanges by focussing the virtual activities through trusted, neutral, locations - the connected SPsWW. Such centres thus become "digital ports", cosmopolitan centres of connectivity catalysing international trade in the same way as the more traditional shipping ports did in the past.

By developing the SPWW initiative, BPSPA is placing connected real estate at the heart of Birmingham's knowledge economy led regeneration by addressing key factors that limit delivery:

- Social Capital: Access to world class mentors and executives
- Financial Capital: Access to knowledgeable, technology savvy equity finance

The BSPA ethos will drive a place that connects the physical to the virtual place to generate a '*place*' where creative minds come together *to* think differently, *to* forge new alliances, *to* do new things, *to* develop new technology-derived businesses. This initiative, embodied in the new iCentrum™ building will exemplify state-of-the-art connected real estate; utilizing the best-in-use ICT-driven building management systems to create a highly flexible, environmentally sustainable work environment. iCentrum™ will be a location-independent work centre, an expansion of the pilot 'Ideas and Communications Suite', which opened at BSPA in January 2011, to establish Birmingham's 'Digital Port'.

As office environs become increasingly collaborative and infrastructure becomes more mobile, with tablets and lap-tops rather than desk-top computers, wireless networks, web-based applications and internet driven telephony and video, so an individual no longer needs to be in one place to be productive. The new workplace switches from predominantly formal individual work space to predominantly collaborative work space, with a variety of formal and informal shared open and fewer 'closed door' enclosed meeting spaces. The new iCentrum™ facilities will embrace this culture and offer increased flexibility and use of unassigned space, linked to IT based management and assignment of personal space upon arrival into the building makes for a more cost-effective use of the buildings.

Linking the physical to the virtual 'place' is central to the iCentrum™ concept, but in common with other connected real estate initiatives it is also about promoting smarter working, managing work-life balance whilst promoting creativity and working in an environmentally sustainable fashion. The iCentrum™ building will offer access to video suites and connected conferencing suites to promote international conferences, reducing the need and hence fiscal and environmental cost of travel. Cisco's use of their internal TelePresence™ suites has led to a saving of $356M in travel cost with concomitant savings in CO_2 emissions from the travel avoided in attending 90,369 meetings.[13]

The clients in this new building will experience a service-based rather than a real-estate offering; they will be members of the iCentrum™ Club, not tenants of a building. They will access services as fulltime members on a daily basis or access as external members on an as-need basis. Such services will include the key elements of access to skills, funding and resources to maximise the effect of any funding secured. As a location independent work place it will act as a bridge between "intelligent offices" and "connected homes" for workers who do not perceive boundaries between their personal and professional lives; an exemplification of connected real estate. iCentrum™ Birmingham will present a location and a set of collaboration and innovation tools, which if successful could be replicated in other industrial cities, to create innovation hubs promoting economic diversification and regeneration.

The SPWW approach is planned to be a public-private partnership for Birmingham and will be integrated into national and sub-national agendas and initiatives outlined in *"Local Growth: realising every place's potential"*.[7] The founding proposition for the SPWW initiative is that through collaboration science parks can provide a web of interconnected hubs; an exact fit with Cisco's 2012 Olympics' Legacy "British innovation Gateway" initiative and their plans for a UK Network of Virtual Innovation Centres.

In the early days of its activities BSPA's Ideas & Communications Suite, the proof of concept for the wider SPWW, has started to address new economy rate-limiting factors as a means of exemplifying the plans.

Social Capital: Access to world class mentors and executives. In areas dominated by the old/sunset industries there is a significant lack of relevant expertise and experience/competencies in the knowledge-based economies. Local management experience derives from low-tech or mass manufacturing and work-force skill sets are not relevant to the new industries. In many such areas this is further exacerbated by the lower overall education attainment levels when compared to areas with established knowledge economies.

Digital connectivity establishes a means to providing geography independent mentoring and investment readiness support. As such the best mentors and Non-Executive Board members can be introduced through the modern communication platforms so that they can frequently 'attend' meetings from a distance and actively participate as if they are in the same room. In this way Boards of fledgling ventures can be strengthened with leaders in the field; which would previously have been

impracticable because of the need to put together the high cost incentive schemes to entice the individual to relocate to work at the physical location. In this way the connected centre can offer its clients the means of attracting talent as if they were located in one of the existing high-tech clusters. Whilst Silicon Valley attracts immigration of talent, with 25% of all new companies having a foreign national as a founder, the attractiveness of places outside such high profile clusters is much less. In regions such as Birmingham where current limitations on securing venture capital are such that the new companies cannot afford expensive packages to lure executives, this approach could make a difference between a world-class, investable, management team and a much less attractive offering.

Personal networks have been promoted as key drivers in the knowledge economy. The physical cluster approach defines that network by geography and is typically measured in a radius of 50 miles. With the iCentrum™ approach, with its trusted 'places' fully integrated into the web infrastructure, there are no boundaries to the network that can be drawn upon.

Access to knowledgeable, technology savvy equity finance: The paucity of true early stage risk finance hinders start-ups especially outside the current technology clusters. Silicon Valley attracts 27% of the total venture capital invested in the United States. In the UK, 70% of the venture capital is invested in the London-Oxford-Cambridge triangle which actually accommodates around 40% of the UK businesses. In comparison to the USA, European equity funding is drip-fed as small sums against deliverables, a significant problem as it necessitates numerous investment rounds with concomitant dilution of founders and the early investor's interest. Lack of timely major investment means founders exit relatively early to protect their returns but then do not see the businesses grow as UK/European companies. There is concern over the fact that whilst UK produces many technology opportunities and SMEs, a number of them 'gazelles', few become 'big gorillas' – the UK has not yet produced a Google, Facebook or PayPall, indeed even Cambridge has only produced the equivalent of one billion dollar company each decade.

The iCentrum™ model offers a new approach to investment, one which it is hoped will entice angels to more readily invest on an international foot-print. Working with Cisco and the Keiretsu Forum BSPA has trialled the 'International Investment Forum'. This is 'work-in-progress' but utilising the same technologies as for the geography independent mentoring and networking this group is assessing the potential of the platform to entice people to engage and invest in companies at a greater distance. Overcoming the historic link between where investors live and where they invest so that they can readily become involved with their investments issues. With the iCentrum™ approach the same effect can be secured irrespective of the location of the venture resulting in increased deal flow and investment opportunities.

Concluding remarks '*There is little if nothing new under the sun'*.

Across the world City Regions and Knowledge Quarters are espoused as the way of creating the next economic clusters; but it is not a new approach, it is one proven across economic history. However, what is apparent is that the stability and lifetime of all clusters are defined by the longevity of the activity/technology that underpins the cluster. A look at the fast pace of change and technology development today suggests that economic clusters will need to be as innovative in their activities and offering as the aggregated knowledge economy ventures that forms the cluster.

Connectivity has always been a key component success. In the past the transport infrastructure around ports, canals, rail and more recently air have been key for the movement of materials and products. For the knowledge economies the fibre infrastructure is the means of aggregating knowledge and for moving products and services. The global digital economies make geography irrelevant; clusters beyond physical location will generate wealth and provide opportunities for cities to compete on a level playing field with the technology clusters established in the 20th Century.

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