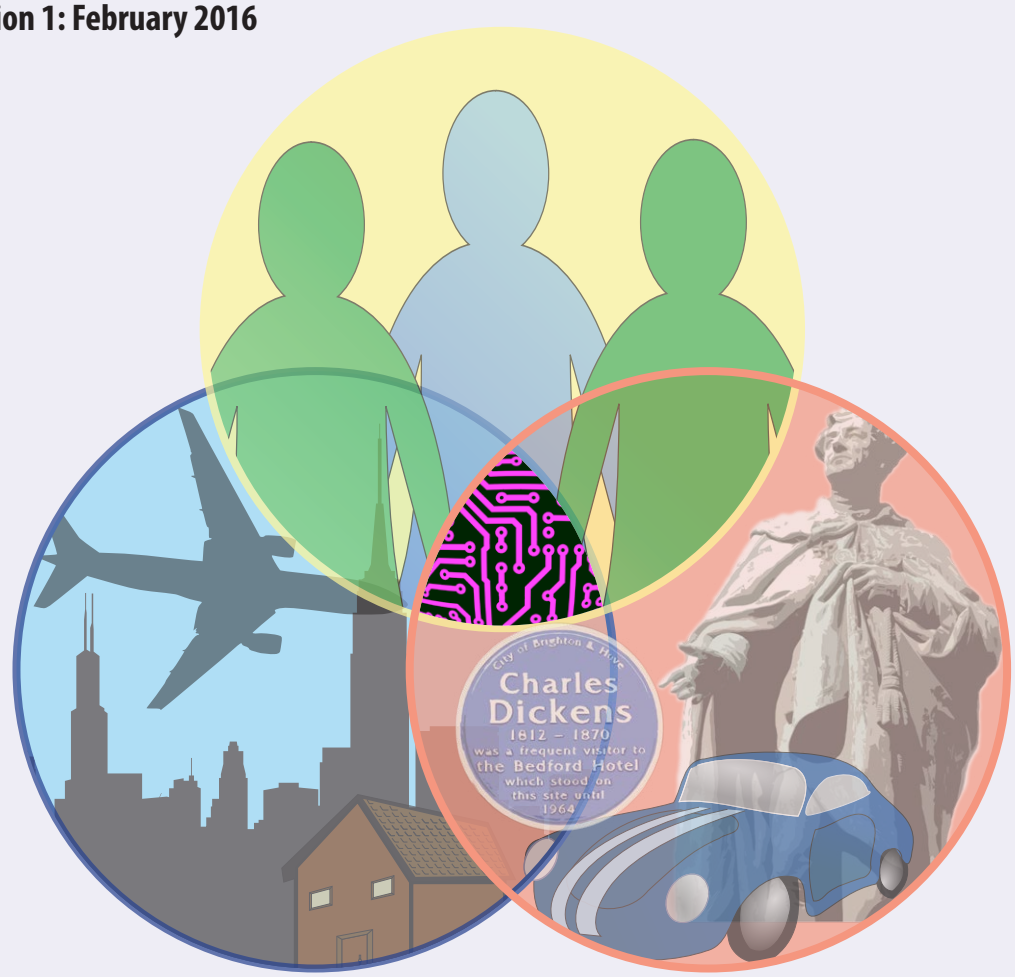
Internet of Place

Innovation in the data-rich experiential economy

Version 1: February 2016



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This is a research-informed resource paper prepared as part of the innovation activities of the Digital Catapult Centre Brighton (DCCB).

It is not intended to be comprehensive but to highlight key areas, offer discussion around them, and provide useful resources for readers to access and relate to their own spheres of focus.

Its aim is to contribute to interaction on innovation strategies across business, policy and research. It includes a 'crowd' approach where feedback will be integrated and acknowledged as new iterations of the paper are produced.

Acknowledgements

I am grateful to the following for their responses:

Attendees at both the DCCB Innovation in the Data Rich Experiential Economy event (25.11.15) at the FuseBox, Wired Sussex, Brighton, and Imperial College London's Digital City Exchange and RCUK DE/2015 Delivering the Urban Promise Conference (10.12.15).

Martin De Saulles (University of Brighton), Kerstin Mey (University of Westminster), Rob Warwick (University of Chichester), Stuart Wilson (American Express).

There is much at stake for the UK in the race to innovate as the largest digital economy in the G-20 group of leading economies. As Boston Consulting Group (BCG) recently reported:

> **The Internet is now the UK's second-biggest economic contributor behind the property sector, having overtaken manufacturing and retail. BCG expects the Internet economy to contribute £180 billion to the overall economy in 2015, up from £120 billion in 2010. At 10 percent of gross domestic product (GDP), this is a larger percentage than in any other G-20 country. By 2016, the Internet economy will be contributing 12.4 percent of GDP in the UK, compared with a G-20 average of 5.3 percent.**

But it warns that:

> **… other G-20 members with rapidly growing online-retail sectors, such as China and South Korea, are closing the gap. The UK needs fresh digital initiatives and a new type of 'Twenty-First Century Industrial Strategy' to ensure these strong growth trends continue to provide jobs and boost the UK economy over the course of the next parliament. (Boston Consulting Group 2015)**

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Introduction: innovation disruption

We stand at a pivotal moment in the digital economy where its history is of only partial use in making sense of its future.

The past has been dominated by information technologies (ITs) and their subsequent fusion with communication technologies (ICTs) to form the virtual networks of first the internet and then the world wide web (www).

The virtual nature of the digital economy to date has been powerful in reshaping society and economy, but its next stages promise much more and challenge our established notions of innovation.

We will see a transformation of our everyday environments – home, city, office, airport, shop, retail park – into intelligent interactive settings with changed meanings for us in data-rich and experiential ways. This includes when we are on the move between places in transport of all kinds, public and private.

We don't have a road map as such for what is called the age of big data (BD) and the internet of everything (IoE) now upon us.

These developments herald diverse forms of integration of digital networks into our physical environments, and new forms of embedded connectivity, which are currently in their infancy.

Our understanding of integrated virtual/embodied experience in everyday life will need to grow as this new world takes shape.

There has been fierce debate throughout the internet's history about the extent to which it signals a new form of industrial revolution.

The combination of BD and IoE developments and the transformations they promise have given this debate major new impetus (see, for example, Rifkin 2015).

A report on London's Tech City offers a useful concise indication of the complexities of the unfolding digital economic realities.

> **This revolution is not only about the hardware of change, the Smartphones, Tablets and Cloud computing. It is as much about new forms of content, fundamentally different software development methods, new combinations of human capital, different financing models, open human networks, business models built on data, location, content, not price. At its heart is an open system approach that generates collaboration and cooperation between individuals and companies at unprecedented levels. (IC Dowson & William Garitty Associates Limited 2012: 8)**

This picture signals the kinds of complexity that would be expected of a revolution – shifts across: technology (hardware and software); social structures and networks; patterns of interaction and value generation; financial and business models.

It portrays simultaneous multidimensional and relational shifts across businesses and service providers (public, profit and non-profit) and their customers and users, as well as among customers and users themselves.

What is clear in such a picture is that the reach of innovation, driven by IT and ICTs in the earlier stages of the internet, has now extended in an age of embedded connectivity into wider and deeper socio-economic and socio-cultural dimensions.

We are looking at transformations of economic and social and cultural structure and process.

In the BD and IoE era, technological applications are increasingly enmeshed with the physical environments within which these structures and processes exist and operate – buildings, public spaces, leisure, arts and consumer settings, and, on the larger scale, communities, cities and transport infrastructures.

One way of thinking through this complexity and its diverse meanings for innovation is at the macro and micro levels.

At the macro level it can be argued that the whole nature of the economy itself is transforming, and at the micro level what we do within that economy and how we do it are undergoing associated transformations.

So we are talking about the changing nature of the broad economic context for innovation, shaping what is possible, and how, for example, business and public and private service models can be constructed.

There are important continuities that help us understand the changes, such as the deepening of intelligent software within the web-based economy and the culture of automation and data feedback it has been facilitating.

When we think about leading network business models such as Facebook and Airbnb, the information age has become an economic reality few could have imagined.

This shows the extent to which the so-called Web 2.0 developments at the end of the last century have supported new kinds of business models utilizing the combination of online platform, data and networking, and logistics of different kinds.

Part of the power of these models is their new network character, wherein information-sharing is inherently a collaborative activity between business and

customer, in broad terms generating large-scale economic value for the former from the economic and social value to the latter.

Intelligent software, and the automated processes driven by it, as well as the multimedia data-rich environments and feedback loops it enables, are central to this power, but how much of the detail of all this has really reshaped the way most people think about the economy and innovation within it?

The service nature of much of what has happened so far in e-business, certainly in a B2C context, means that the most obvious change is that we are doing things we used to do (shopping, booking holidays, keeping in touch with friends and family, buying or renting accommodation, etc) faster, more easily and in more data-rich ways than previously, thanks to online platforms and communication.

So on the surface the economy has simply become more efficient and better networked rather than changing fundamentally, while behind the screens through which we access it, software and data have been embedding themselves within economic structures in dramatic ways.

In this context, the nature of online platforms has been worthy of more attention in terms of understanding processes of change, and this will be even more the case as the BD era is further established.

Advances and experimentation with distributed systems along 'blockchain' lines show how innovation is directly addressing the need for such embedding to integrate new virtual mechanisms of trust and protection into shared data and exchange processes (Wall Street Journal CIO Journal 2016).

While diminishing some concerns about security of data and matters of privacy, such developments also raise new questions and challenges around protocols and transparent organization to facilitate the acceptance as well as the effectiveness of these systems (on associated issues see Clippinger 2015 and Pew Research Center 2014).

Innovation moves out from behind the screen

Understanding what has already been happening more effectively may well be part of the path towards expanded awareness of innovation possibilities in the BD and IoE era.

In some senses what has been largely back room change through software in the virtual environment of ICTs is increasingly moving out into the physical day-to-day world we experience.

The shift here is from a digital economy of virtual networks overlaid or connected with the physical world to one where those networks begin to reshape the fabric of that world, as well as how we experience and interact with it, and change it.

The shift is also from a scenario where screens of different kinds have been the main mediators across the virtual and physical worlds to one where interfaces are manifested through different kinds of objects and locations in varied ways.

This means that our sense of what these (intelligent) networked and interactive objects and locations are, as well as our experience of them, are open to substantial change.

Innovation is not just about connectivity, in established virtual terms, and what it enables, but about embedded connectivity – the objects we engage with and the environments we occupy and move across.

This signals a new kind of integrated innovation connecting people, places and things, and extending through all areas of daily life including domestic and work settings as well as those concerning health and education, leisure and consumption, travel and entertainment.

People, places, things

We can think about this new holistic context for innovation as a move beyond the screen, but the big picture is also more than that.

This holism entails new dynamics of innovation connecting people, places and things, and paths to innovation drawing on new possibilities across all of them.

Integrated innovation:
connecting people, places and things

IoT recontextualizes technology-driven innovation within social and spatial frames that expand the very notion of what innovation is and how it is generated.

IoT not only requires joining of dots across technological, social and spatial contexts. It prompts us to focus our innovation lens as much on the social and spatial as we have traditionally on the technological.

This is a major challenge if we accept how heavily understanding of innovation has been technology-shaped in the past.

How do we expand the innovation lens to incorporate places and things?

More importantly how do we focus sharply on the innovative dynamics linking technologies, people, and transformative structures and processes involving places and things?

It is helpful to recognize this as a continuum from the age of virtual networking, which has increasingly transformed the marketplace, business models and social networks.

Now these shifts move a dramatic stage further, extending and expanding these transformations in ways that are embedded in physical environments and our moment-by-moment experience of them.

Are we talking about a changed world or a major revolution, including through the potential for virtually-mediated augmented realities to be woven increasingly into our everyday lives?

Time will tell, but it is at least worth considering whether the comprehensive scale of this change in economic, social and cultural terms matches in any way that of the industrial revolution.

> **The digital revolution has increased levels of participation in informal cultural and creative activity and has expanded the universe of artists. It has created new networks and forms of interaction, transformed the production and distribution of established art and cultural content and allowed new forms of art and culture to emerge. It has also enabled many more people to access UK culture internationally and has the potential to reach still more. But we can do more to exploit the opportunities offered by digital media to broaden interest in and access to culture by enhancing the experiences of consumers and producers alike. (Warwick Commission 2015: 15)**

It can be argued that there is potentially revolutionary scope and scale in how we think about and operate across all areas of our lives, public and private.

> **As digital is pervasive across most aspects of our lives, so the 'digital economy' is becoming synonymous with the national economy. Digital skills – the skills needed to interact with digital technologies – are life skills, necessary for most aspects of life. (House of Lords Select Committee on Digital Skills 2015)**

Value and the 'Internet of Place'

Our economic and social senses of place have been expanded by digital networks and interactivity as we have moved increasingly beyond an industrial economy into a digital economy.

It is an everyday experience for many of us to operate seamlessly across virtual online spaces and physical offline locations in work and play, our domestic and public lives.

The everydayness does not necessarily make us actively conscious of the degree to which our thinking about place has already undergone transformation.

In a digital economy place is hybrid – virtual and physical – and this inevitably leads to multiple timescapes and mobilities relevant to both and their interconnections.

The concept of the Internet of Place (IoP) helps us to navigate the changes and their potential for new forms of innovation, as embedded connectivity becomes increasingly a reality in IoE.

Place and place-making go beyond a blank notion of space and focus attention more on the nature and purpose of different spaces, as well as their relationship to one another, and most importantly the identification of people with them and their contrasting and potential uses of them.

Places have always been as much symbolic as material, 'imagined' (Anderson 2006) as well as real, and linked to different forms of, and ideas about, communities, and the spaces they operate in and through – local, national and global.

Ideas about place take us into the realm of values in relation to both spaces themselves and the ways they are viewed and used by people, for example through different kinds of communities of practice (on associated issues see Wenger, McDermott and Snyder 2002 and Wenger 2009), including around open source issues.

Values help us to join the dots towards integrated innovation involving people, places and things.

This means stretching innovation ideas into new senses of place where all actors within it – businesses, services, customers – need to be viewed in terms of data, for example, and its potential to enrich their experience.

In other words, in a world of embedded connectivity, the environments we inhabit go well beyond the familiar physical ones of the industrial era and are immersive in terms of their informational fabric.

We need to recognize the extent to which our understanding of value and ways of

generating it have yet to move into this new era that entails a fundamental shift in the way we see the economy.

We need to see the economy fully in terms of the invisible networks and data flows as well as the familiar physical locations of outlets and service points.

Two major challenges exist in this context:

- Negotiating the shifting horizons of the physical and the virtual networked dimensions of the new data-rich experiential economy.
- Enabling new forms of innovative imagination and ambition to make the most of this embedded connectivity and its market and service potential.

Time/space and value-driven horizons

Paths towards addressing these challenges include fresh and creative perspectives on our relationship to places and the possibilities for enriching their value and meaning.

This is at the heart of the new innovation culture, where potential is locked into these transformations.

Perspectives associated with our familiarity with the industrial economy as a network of physical locations – office, factory, shop, warehouse, mall, High Street – can be an inhibiting factor.

While that infrastructure continues to drive the economy and the physical goods, services and exchange that take place within it, it has been expanded into the beginnings of a new data-rich experiential economy where virtual networks offer new value-driven horizons.

It would probably not be an overstatement to claim that at present we see in much innovation a sticking together of the physical and virtual dimensions of this new economy, rather than a full integration of them, to enable completely new visions of value within them to flow easily.

Assessments of the reasons for this are varied, but one big influence is the long history of the industrial economy and the relatively short and rapid development of the digital economy.

It can be argued that while progress has been made in extending the industrial economy model into a digital one, we are far from transforming it completely.

We can illustrate this easily in time/space terms through online shopping, which removes the barriers of physical travel, time involved and transfer of goods home, from the industrial era, to 24/7 purchase flexibility without travel, and delivery of goods direct to the customer, which the digital side of business now offers.

Similarly with services, instead of visiting a physical office during restricted

opening hours and taking time with face-to-face advice and purchases and services, customers have 24/7 flexibility online to take up services without travel or face-to-face time involved.

In both cases the data-rich online environment allows for much more information to be provided, comparisons to be made instantly, and varied levels of interaction to take place.

What we now have to do is move beyond this bolt-on idea of the digital economy to a truly transformational one, and working on the basis of IoP can help us to do that.

We have existing towns, villages, cities, airports, business and innovation parks, and communities, and their presence as physical entities is all too familiar to us.

In the new economy we need to think afresh about what these different places are, how they work or do not work well, how they could be improved, and, crucially, how the experience of them and the value they produce should and could be enhanced.

We could call this a rediscovery of place in the context of embedded connectivity.

Centrally in this shift to a digital economy, we have to build into fresh thinking its data-rich time/space opportunities, which take us way beyond the physical and into the networked economy.

This economy is global as much as it is local in its potential reach, operates 24/7, offers expanding possibilities for delivering real-time data and interactions based on it, as well as for building pop-up and longer-standing forms of community.

These developments point to the vital role of combined virtual data and physical imaginaries to fuel innovation.

These imaginaries work to conceive of place and our experience of it in networked data as much as physical terms. This applies to our thinking about business and services as much as their customers.

The bolt-on industrial-plus-digital economy model we predominantly have now will increasingly shift into this holistic mode, recognizing how the potential for generating different forms of value has transformed for all involved – business and service providers and their customers and users.

This is a basic dimension of thinking about new business models in the new data-rich experiential economy.

Whether we are talking about areas as distinct as traditional retail fashion or health, this new economy drives us towards thinking, in equal measure, about the physical sites related to sales and service, and how data enrichment of those sites can enhance their experiential value in different ways.

The extent to which the digital economy has expanded time and space in terms of its 24/7 global reach and flexibility presents major new challenges for innovation imaginaries as well.

These include identifying and catering in more fashioned ways to different customer and service user bases near and far, including those that may first be engaged at a distance and may then come near, as visitors, for example.

Such a straightforward point signals the multidimensionality of customer and service user configuration and interaction that can be built into new business models.

The granularity of these possibilities is endless but does require including data-related economic value as fundamental to new business and service propositions.

Place is all about people and experience. Much of who we identify ourselves to be links to places and experiences at different times and in varied ways. The horizons for such possibilities are expanding dramatically thanks to BD and IoE.

- How do we see people as visitors, customers and service users in this new spatio-temporality and the real-time and interactive nature of this economy's expanding data streams – audio, visual, textual?
- How do we think about enhancing their experience and all dimensions of it – efficiency through time-saving and better choices, relaxation and enjoyment, sense of individual attention and engagement, development of trust and loyalty? The list goes on and will have wide ranges of possibilities for different areas of business and service.

Potential for real-time interactive data-fuelled engagement between those who are providing goods and services and those who are interested in them as actual or potential customers will continue to grow.

Further, the opportunities for stretching this engagement virtually in time/space terms through ongoing connectivity and relationship-building are also multidimensional.

IoP signals a tipping point?

Does IoP signal a tipping point in our thinking about innovation as predominantly driven by technological innovation?

Is the era of BD and IoE shifting perspectives more towards integrated innovation, where technological factors are contextualized much more strongly and creatively within human contexts of people, places and things?

Positive answers to these two questions point us towards fresh trajectories on innovation that go beyond the technology-dominated perspectives of the past.

They also prompt us to think about place as a means of facilitating new forms of collaboration for innovation across government, business, research and education.

Place is something we all share so it can be a facilitator for thinking and meeting beyond silos of interest and expertise.

As a focus place can help us to break down barriers to shared insights and visions which those silos tend to inhibit.

> **Currently the major players are not in synergy; our inquiry has shown that the UK is structurally weak and has not yet created the right human capital, infrastructure and business environment to support a changing society. (House of Commons Select Committee on Digital Skills 2015)**

Attention to place offers possibilities to share different meanings and ambitions for change as well as collaboratively designed and informed paths towards achieving such change. A recent report on *Designing the Digital Economy* (Design Commission 2014) emphasized the role of designers in helping us to do this.

> **Designers are critical agents who are able to mediate between people, places and technology. They have the ability to ask bigger questions that put people at the centre of the Digital Economy, and not the technology itself. (Design Commission 2014: 4)**

Design is among the creative skill sets, which have been highlighted as helping to drive success in the creative, digital and IT sector through fusion with technological skill sets and approaches (*The Brighton Fuse* 2013. See also Nesta 2015).

The FuseBox24 project experimented successfully with combining lean business, creative arts and technology approaches to support the development of innovators and their businesses (*FuseBox24* 2015).

One of the key areas of learning in FuseBox24 was around collaboration, including through its research-innovation model focused on collaboration across business, technology, creative arts and research.

> **The fusion concept … draws attention to the methods we use to bring about innovation as much as the resulting innovations themselves. Inevitably in this context the need for new forms of open-knowledge exchange processes across different areas of expertise and orientation are a high priority. (*FuseBox24* 2015: 11)**

So core to new forms of innovation are new ways of innovating or paths to innovation.

These should effectively integrate, from first principles, what possibilities technological developments offer, integrated with what people need or could be empowered or assisted by, in specific places and in connection with things in those places.

One way of understanding this would be a matrix approach to innovation that contextualizes established thinking about technological developments more effectively within socio-economic and socio-cultural circumstances, needs and possibilities.

This entails breaking down the STEM (science, technology, engineering and maths) container for innovation, and integrating creative arts, design and humanities perspectives and approaches into its outlooks and frameworks. This includes revisioning science/creative arts/design linkages through education at all levels, as well as in different forms of apprenticeship, training, lifelong learning and skills development.

Core challenges include:

Translating social networking culture and values to new business and service models connecting people, places and things.

Developing new cultures for communicating across technical, business and creative boundaries to focus on different forms of expertise and how they can be fused in fresh and productive ways.

Finding new ways to enrich the wider digital economy through insights from the creative and cultural sectors, including, for example, in key areas such as audiences and user experience.

Using creative arts and design methods to help form new paths to innovation, integrating people, places and things with technological strategies.

Creating new experimental environments to mash up and connect different expert languages and approaches, from programming to architecture, visual arts to product design, etc.

> **Collaboration is a contact sport, so shared physical spaces can be incredibly valuable for providing an environment to stimulate and support collaborations. Co-location of academics and industrialists can generate a vibrant environment that fosters knowledge creation and technology transfer, and collaborative work is**

> **often at its most effective when people are able to work side-by-side, with a free flow of ideas. Physical hubs can catalyse contacts between relevant individuals or organisations and provide a framework for collaboration. However, hubs are by no means a panacea and there is a litany of well-intentioned initiatives that have failed to engage users successfully. Physical hubs tend to support collaboration best when they provide an attractive and concrete service in addition to shared space. The services on offer have to match a need in the business or academic community in order to persuade people to use them. This can be brokerage, funding, access to specialist equipment or services, or simply common ground for experimentation. (Department of Business, Innovation and Skills 2015: 37. See also Sleigh 2015)**

Forming fused narratives of innovation that weave granular elements of the social and cultural into the technological story.

New fused learning on the IT barriers holding back digital developments in the arts and cultural sector, and the limits to socio-cultural visions for innovation in digital economy.

> **70% of arts and cultural organisations cite lack of funding and time, and over a third still feel that they do not have the in-house skills, IT systems or the necessary expert advice to meet their digital aspirations.**
>
> **Consistent with this picture, whilst 75% of organisations are planning to introduce at least one new activity in the next 12 months, one in four are not planning to introduce any new digital activities at all. (Digital R&D Fund for the Arts 2014: 12)**

New ambitions that connect digital perspectives across the creative and IT-oriented sectors, towards shared paths of insight and innovation.

> **New business models, making more of data, accessibility and experiences designed for mobile are all major opportunity areas for our sector. (Digital R&D Fund for the Arts 2015: 5)**

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