

# Cities of the near future

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Good morning everybody – can I add my welcome to that of Jon to this inaugural City<sup>x</sup> expo

This morning I want to talk about cities of the near future

Harvard professor Ed Glaeser says cities are humanity's greatest innovation

Cities are home to more than half of the world's population – maybe as much as 84% according to recent analysis from the sort of aerial imagery you can see behind me – and they are expected to add another 2.5 billion new residents by 2050.

And it's not just people that are concentrated in cities and urban areas - the top 50 cities produce 40% of the world's output.

In a context of stagnating Western productivity, this link between economic activity and urbanism is one worth pausing to better understand.

Research shows that a city that doubles in population enjoys an average 130% gain in economic productivity – both total and per capita. Why?

Because urban areas are more densely packed they enable more efficient use of resources, but they also allow more active diffusion of ideas and innovations – think for a moment about how revolution ideas spread like wildfire through history, and how many of today's companies are born through serendipitous conversation in urban coffee shops.

In short, as the UK Government's Industrial Strategy itself has noted, 'Place' is a vital component of economic success; taken together, our cities and urban areas are the engines that drive local and national productivity, producing in turn prosperous communities.

**Over time those engines require upgrades to deal with new volumes of demand.**

Just as truly as urbanisation enables productivity, poorly managed urbanisation generates productivity-sapping effects – the all too familiar downsides of urban living.

Think for a moment about the way that poor planning results in mis-aligned infrastructure and lost economic opportunities by forcing many workers to live at some distance from their places of work.

While commuting from home to work (and back), those workers are not only generating congestion and contributing to the pollution of our shared air, but evidence has shown that they are also being subjected to higher levels of stress than fighter pilots engaged in aerial manoeuvres, or riot police facing mobs. The time it takes to detoxify those workers' brains from that stress eats into their productivity for the first hour or so after arriving at work – and weakens their social bonds at the end of the day too.

It is argued that this work/life pattern enforced by our built environment is one contributing reason for why 35% of UK citizens report they do not feel connected to community. This epidemic of loneliness is of course bad for the individuals concerned but it's also bad for the economy since emotional isolation is ranked as high a risk factor for mortality as smoking, leading to low (or nil) economic productivity.

Bold leaders of urban places have had a long history of harnessing innovation to adapt to changing circumstances (often in partnership with the private sector) – from Roman aqueducts and bridges, to Victorian street lights and sewers, Manhattan's skyscrapers, London's underground trains and contactless smart ticketing, being a small fraction of examples.

**Today's emerging Advanced Urban Services offers a new set of productivity enabling 'upgrades' to boost the benefits of city life and mitigate the negative aspects.**

Barcelona and Cisco have prototyped an innovative urban mobility service that eases congestion and smooths daily commutes by helping people make better choices about when they should leave for work – effectively an app that tells you “stay in bed 10 minutes longer this morning; you'll avoid the crush and still arrive at work at the same time”.

Glasgow (like many cities) has retrofitted miles of old-style streetlights with LEDs. In addition to the energy saving benefits, the connected nature of these new lights enables pre-emptive maintenance and dynamic management of

lighting – in fact, where most places have focused on turning lights down at night, Glasgow has discovered that turning the street lights up at key times helps to reduce crime and support the night-time economy.

By tracking the sources of pollution and regulating traffic and construction accordingly, Beijing reduced deadly airborne pollutants by roughly 20 percent in less than a year.

Stockholm pioneered the installation of a public-owned fibre network across the city region, with one million kilometres of cable providing a superfast digital infrastructure to 790,000 citizens and 100% of businesses. Stockholm describes this as a strategic utility for a C21st city, as essential as water or power. Crucially, in addition to enabling the digitisation of city services, this infrastructure is driving economic productivity in the city – the city is home to a high number of digital start-ups, including unicorns like Skype and Spotify. In fact, at 18% of the work force, ‘Programmer’ is now the most common job role in Stockholm.

Eindhoven invested €6.3 million in dedicated cycling infrastructure – the Hovenring. to improve the safety and practicality of cycling as a means of everyday travel. This 1,000-ton steel deck is suspended by 24 cables from a towering space needle. The city even lowered the roadbed below to keep the approach ramps at a nice, easy slope. The Hovenring makes cycling a serious option for getting about the city and is a joy for the thousands of commuters who now pedal into and out of Eindhoven every day.

These are just a few examples of incredible urban innovation – you will no doubt have your own favourites.

## **So onto the role of Future Cities Catapult**

**Here at Future Cities Catapult, our mission is to help UK businesses develop more of these kinds of innovative products and services needed by our cities – and help sell them to the world.**

In this way we are working to help to grow the UK economy – both in terms of a booming Advanced Urban Services sector, but also more productive cities and urban areas.

Unlike some of our sister Catapults, which have cutting-edge kit firms can book time on, we are a *systems* Catapult. Our offer is not about access to hardware,

but rather access to experts who can help firms understand and navigate complex systems.

Of course, Catapults only exist where there are market failures and barriers to the organic adoption of innovation – in the future cities space, while there is a long history of technology enabled solutions, the development and adoption of such innovations is struggling to keep pace with need. Our research has identified a range of common barriers, each of which we are working to dismantle.

Perhaps the most significant barrier is not technical but cultural – the **lack of buyer confidence** in cities to harness new technologies, in part through poor information exchange, and procurement practices that discourage innovation.

To tackle this, we are working with influential partners who can amplify our influence with councils in the UK. These include The Society for Local Authority Chief Executives, the Local Government Chronicle, the LGA procurement group, the Commissioning Academy, the recruitment firm Penna and others.

The aim: to boost buyer confidence, to raise awareness of art of the possible and to grow new capabilities among buyers. So, in a fortnight's time, we will be at the SOLACE Summit talking about our work on what a Hyperconnected City might look like and how it might be achieved. Crucially we will be showcasing British businesses with Advanced Urban Services and solutions that both enable and are enabled by, next generation 5 G connectivity.

Second is the challenge of **fragmentation and silos in city services and assets**. This disjointedness limits the scope for innovative practices and hinders the creation of value from data.

Our response to this is an unrelenting emphasis on human-centred, use case-based innovation that steps back from the mess of existing wiring and tries to articulate the essential need or objective, and then build from that foundation. It's about harnessing today's technology to radically re-imagine and re-engineer how our cities work, not simply digitising existing process to deliver a more efficient version of what we have now.

Of course, having identified a need and help develop a solution, the next step is scaling. Presently, **poor market co-ordination** means that there are few technical standards and models that allow integrated and interoperable solutions to scale from one city to another.

Since one city – however large it may be – is not a market, we have invested in the development and promotion of future cities standards, including supporting MHCLG's Local Digital Declaration (which has adopted a term I previously popularised in Bristol – on the need to 'fix the plumbing'). We have also entered into a strategic partnership with TM Forum, the membership body for the telecoms sector who have an office in our building; and early this month we launched a City Standards Network using the network of networks principle.

In addition to our standards work, we also get hands on in the coordination of innovation efforts, forging consortia with places and private sector partners to invest in new solutions to thematic challenges. And we're always looking for new partners. So, if you are interested in working with us – you know where will live and this week we are living here quite a lot!

**Regulation** is also often cited as a major barrier to innovation, especially in terms of undermining innovators' confidence to invest.

In response to this challenge, earlier in the summer we used our neutral convening power to bring together regulators, placemakers and providers as part of an experimental regulatory sandbox looking at regulation in planning, of which more later...

Even those administrations who are looking to take advantage of innovation are impeded by **highly constrained budgets and resources** with little flexibility in financial or intellectual capacity to direct towards innovation (and little appetite for 'failure'). Before joining the Catapult I was CEO at Bristol City Council for over three years working with a directly elected Mayor, and before that I was the CEO at Hull City Council for over four years.

As an experienced local authority chief executive, I am all too aware that undertaking innovation in the public sector is exceptionally challenging.

That's why here at Future Cities Catapult we have repeatedly invested in making the first step, undertaking the exploratory research into the art of the possible, developing proof of concept products and services – ourselves or with the market, and integrating impact evaluation and evidence generation in everything we do. All of this is brought together and exemplified in our Future of Planning open call.

The final barrier that has plagued the future cities market has been a **disconnect between what the market is offering and what is needed.**

This disconnect has led to many an innovative product being created for whom there is simply no buyer. As one of our Associate Directors regularly says: **usefulness always trumps cleverness.**

This disconnect is partly the market failing to engage buyers at the right point in product development and it is partly cities being unable to articulate what they need in a way that the market can understand. Our response is to convene both sides of the market, to provide neutral brokerage and translation - hence the event we are holding this week - City<sup>x</sup>!

### **So why are we running City<sup>x</sup>?**

Well, everything we do is about driving business growth. First and foremost, we are about growing companies and the wider economy. But, of course, we want to do that in a way that makes cities better places to live, work and play.

In fact, we want to make the UK's Advanced Urban Services sector a competitor to Financial Services for the primary plank of the national economy!

City<sup>x</sup> is an embodiment of the convening and showcasing elements of our approach.

Inspiration and provocation from the leading edge of urban innovation to raise awareness and ambition among buyers.

Showcasing great innovative products and services on the market right now that can help solve pressing urban challenges and unlock greater local productivity; and brokering new connections across the market, centred around three well established needs of place leaders.

Working backwards over the week these three themes are:

- Thursday – better, more inclusive urban mobility – by which I mean people-powered active travel, not modal shift and ‘transport systems’ (for which there is a dedicated Catapult);
- Wednesday – improved air quality – both outdoor and indoor – and wider drivers of urban wellbeing, which affect not only the bottom line of local public services but also affect productivity in the labour market; and
- Today – a more agile, adaptable planning and development system.

## **Let me take a close look at today theme then – why Adaptability?**

Good planning is essential to successful cities and thus broader economic success – and yet we still have a planning system where sellotaping bits of A4 paper to lampposts is standard practise and the legislation requires councils to display hard copies of local plans in libraries. The one technology that does seem to have penetrated the system is PDFs. Think of the wealth of data gathered as part of plans which is held in unstructured PDFs – the format where, as one of our data scientists says: **‘data goes to die’**.

Research by McKinsey suggests that the Planning and Development Sector (and related Real Estate and Construction sectors) are among the least digitised. In fact, construction is only one place away from agriculture, which is at the bottom! If as a nation we are to really become more productive this situation needs to change.

The opportunity for transformation is huge – planning authorities in England receive around 450,000 planning applications a year and a typical household application takes between four to seven hours to process. Around 50% of these are returned to applicants as invalid because they lack the right information or require modifications. And yet reviewing and responding to that application is still a largely manual process, undertaken by a highly trained professional.

**I believe that ‘We are currently trying to meet the needs of C21st cities with C20th tools and C19th governance models.’**

It is also the case that stimulating innovation in the planning system carries a double benefit.

It creates opportunities for companies delivering new solutions to grow and it delivers in turn productivity gains for planning authorities and developers alike through improved user experiences. You can see a selection of the companies offering such solutions here today.

But Innovation in the planning system that achieves a good, responsive planning process and service also enables productivity through having the right built environment infrastructure in the right places in a timely fashion to accommodate growth.

I would argue that uniquely amongst public services, planning is the critical enabler of the wider built environment industry – including housing,

construction, regeneration, infrastructure and transport. It is the only area where actors from all these industries come together. Digitisation of the planning system has the potential to not only improve local planning services but unlock innovation and development across the whole built environment sector, helping solve some of the UK's biggest challenges like the housing crisis.

This is a critical moment for UK plc. The UK can be a world leader in digitising the planning system in the same way that we are in Buildings Information Modelling (BIM), which has digitised the architecture and engineering professions and is now used throughout the world.

Through our Future of Planning programme we have worked to help the UK seize that opportunity.

We have catalysed new thinking in planning through ground-breaking research into the planning system of today and how it might work in the future.

We have enabled the production of proof of concepts for entirely new products and services through our open call which attracted around 90 submissions from innovative private firms and planning teams.

We founded PlanTech week to showcase this emerging sector, the second of which we held in July.

Thanks in part to these efforts we are also seeing traction in Whitehall around innovation in planning – the creation of the Geospatial Commission, the appointment of a Chief Digital Officer at MHCLG and investment in innovation within the Planning Delivery Fund. Beyond England, we are also now working at the invitation of the Scottish Government on a review and upgrade of the Scottish Planning System.

Over the course of today you will hear more about what has been happening, including, importantly, from businesses rising to the opportunity – businesses like:

- Prospective, who are developing digital twins of cities to allow more responsive decisions;
- Open System Lab, who worked with Southwark planning department to develop machine-readable planning guidance and rules – enabling the automation of simple decisions; and

- Land Insight, whose products bring disparate planning data together into one searchable platform which developers can use to make more informed decisions.

Virtual and Immersive Reality is also playing an increasing part in this sector. On this floor, we also have a new feature here in our innovation hub – a VR experience delivered in partnership with IglooVision, where you will discover firms showcasing how their products can transform how our cities are managed, planned and experienced.

### **So, why has today been badged as the Adaptable City, what do we mean by the term?**

The decisions we make today shape our future - no more so perhaps than in the built environment.

From the winding pedestrian Lanes of Brighton, conceived by people who never imagined the need to make space for ‘horseless carriages’, to the planners behind the likes of Swindon and Milton Keynes, who could think of little else, developers and planning officers are making decisions about tomorrow based largely on today’s ideas.

### **We are quite literally planning the cities of the near future today.**

Of course, the best planners and developers do always consider the future, but in doing so they often face an uphill struggle. In a rapidly changing world, anyone making decisions about something as complex as a city must channel what our Head of our Planning Programme refers to as their inner ‘Mystic Meg’ when developing and evaluating plans. They have to consider not just one set of trends, but a complex interplay of different possible futures that intersect and overlap.

They need to think about the future of work, the future of the environment, the future of transport, the future of industry, the future of retail, all at once when developing a plan for a city, town or district.

As Joyeeta Das of Gyana, an AI-driven data analytics firm said at our PlanTech Week earlier this year, one of the key challenges for planners is: “Can we really know or predict what the function of space will be in the future?”

With the rise of space-as-a-service, as exemplified by WeWork, the anticipated increasing role of drones in delivery, and mobility innovations such as

autonomous vehicles and high-speed rail, how should planners and developers evaluate the value of different locations in the future?

Public institutions tend to move slowly, but today's world moves at the speed of light along fibre optic cables.

The slide you can see maps the timeline for the development of the London Plan. It shows that it started before the financial crash of 2008; Apple had not even invented the iPhone and during the course of its development there were three different Presidents of the United States - but probably more crucially for London three different London Mayors.

The Adaptable City needs to be one that is more responsive and resilient to changing needs, both in terms of willingness to re-engineer services and also to rapidly reimagine and redesignate use of space.

As Carlo Ratti of MIT puts it: "Imagine a city where the government embraces ongoing transformation; planners efficiently rezone land for temporary uses; buildings serve a diverse mix of functions as needed; policing and prevention strategies are smart and data-driven; agencies share and seamlessly redeploy their IT assets; interoperable transport systems are optimized by real-time information; the energy network maximizes use of renewables while ensuring secure supply; and the education system quickly adapts to reflect the economy's changing needs."

So how might city managers, mayors and private developers foster greater adaptability in their placemaking to deliver Carlo's imagination. Our Future Cities Catapult proposition is that they do this:

- By designing in flexibility from the start
- By harnessing regulation to enable innovation
- By not starting with the tech
- And crucially by starting with the people

Taking these in turn.

### **Designing in flexibility from the start**

Traditionally we have planned and designed buildings and infrastructure with the expectation that it will last. Cities like London are replete with buildings

and spaces that were designed and built generations ago with a specific purpose in mind.

Sometimes that purpose remains relevant – there is still high demand for Georgian homes with their high ceilings and large windows.

Sometimes the original purpose falls out of favour and the building that housed it becomes moribund along with it – think about all those derelict sanatoriums. Or the disused facilities from the 2004 Olympics in Athens.

The best places though can be re-engineered for a new purpose. This building itself is an example of that, with a rich history of different uses from workhouse, to recording studio and then film set, and now an innovation hub.

With the pace of change accelerating and new technologies driving previously unimagined possibilities, any plans we make today for our urban environments must have flexibility designed in from their inception.

Carlo Ratti again: “Agile planning and management of land is becoming an urban as well as an agricultural concept, challenging the common assumption that land use change has to be expensive, time consuming and involve a long-term tie-up of the plot.”

I’ve adapted what he goes on to say, which is: “Agility promotes the idea that land use can be temporary – for example, moveable prefabricated buildings; it should be well distributed between vehicles, people and open space – currently about 80% of the public realm of a city is made up of roads; it should be capable of reacting to change quickly even if only for pop-up use; it should be easily repurposed – for example car parks that become flats; and it should be able to support multiple uses on the same plot, where buildings are energy producers as well as consumers.”

Several glimpses of this more adaptable future can be seen today – like the subterranean farm in Clapham, which has transformed a disused air raid shelter into a hydroponic vertical farm which now supplies companies like Marks and Spencer.

Or in New York’s High Line, whose architects re-imagined a disused elevated railway as a public park and pedestrian route through the city – and in turn transformed a post-industrial scar into a world-renowned asset and tourist destination.

Moving from re-imagining the use of existing buildings and infrastructure, to creative use of more temporary structures. We have BoxPark, a company which has embraced adaptability, providing 'pop-up' shopping centres constructed entirely from repurposed shipping containers. They have locations in Shoreditch, Croydon and I understand coming soon – Wembley.

Smaller versions of this kind of 'meanwhile' development using low-cost, easily modified elements like shipping containers can be seen in many cities. It allows allow quick and flexible experimentation – whether providing co-working spaces, food and beverage pop-ups, community spaces, or retail.

The next area adaptable cities must engage in is **regulation**.

Regulation as far as innovation is concerned is currently and rather unfortunately now widely seen as something we introduce in response to 'a genie' that has already escaped the bottle. It is usually intended to constrain or stop something altogether.

Let me explore and explain more.

There has been much discussion, including in this room at yesterday evening's City<sup>x</sup> launch, on issues in public trust related to future cities technologies. Last night's discussion included debate around how cities should regulate those companies who are harnessing digital technology to disrupt existing ecosystems – from AirBnB to Uber to WeWork.

Central to the debate is a question.

How should city authorities regulate such disruptors and others like them using their platforms?

For example, what does the patchwork repurposing of private housing into peer-to-peer hotel provision mean for local taxation? Should AirBnB hosts pay business rates on their property or council tax? And if so after how many nights stay?

And all this before we start talking about the use of drones, facial recognition and AI, and what regulation might be appropriate around those technologies.

Here at Future Cities Catapult we would certainly advocate for a smarter public sphere – one that keeps up with, even ahead of, the technology curve. We want public authorities to understand and engage carefully in the ethical and

governance issues around Advanced Urban Services. We need this to ensure that civil liberties and the public interest are protected. That citizens feel they can trust those services to be managed responsibly, in order that the benefits new technologies can bring are not outweighed by a failure to meet valid concerns.

However, I would also suggest that adaptable cities seek to regulate not against problems but **for** an opportunity. They work in open dialogue with the market and harness regulation to drive innovation and economic success, rather than seeking to police it retrospectively.

This approach is already common in FinTech, where the Competition and Markets Authority has set up a Regulatory Sandbox to test and iterate new regulations that incentivise innovation. Being quick to design regulations that accommodate new business models has been a source of competitive advantage in the UK's Financial Services sector and could be for cities too. We are definitely arguing here for a regulatory sandbox for the Local Plan and Development Service across the UK.

My final two pointers for the would-be adaptable city are linked. Firstly, when seeking to integrate innovation, beware of starting with the tech.

We have an unofficial patron saint here at FCC, an architect from the 1970s called Cedric Price who said: "Technology is the answer, but what is the question?"

The world is littered with 'smart city' demonstrators packed with technology – but devoid of people. Masdar in the UAE is a case in point. Indeed, such a tech-led approach is to blame for much of the failure in the 'smart cities' market, which focused on selling and integrating exciting new kit before properly exploring the use cases and the user demand for the solution being promoted.

It turns out, that in most part, people don't want to live in over-engineered tech-utopias. Discovering this has proved an expensive lesson for more than one public administration and their private developer partners. At one extreme, the result is ghost towns like Masdar. At the other, it means expensive infrastructure in functioning cities that never actually gets turned on. More likely still, it means tech solutions which never even get bought in the first place.

Rather than starting with what the tech can do and trying to reverse engineer a need, adaptable cities start by seeking to properly understand the real needs of their population, and why those needs exist.

Behavioural economics and neuroscience are therefore just as important tools for urban innovators as sensors, digital modelling and the like. Before investing in a new app or digital service, understand why people are not using the current service. Is it a technology problem, or a human problem?

My Head of Executive Office was telling me recently about work he did in central government looking at why people weren't taking up the government's free loft insulation service – it turned out that a significant volume of people were embarrassed that their lofts were a mess but couldn't face clearing up their loft in order to let the contractors in to lay the insulation. So they never took up the offer.

Once you understand how these kinds of human behaviours shape actions, you can make different choices and steer people towards different behaviours. Sometimes, armed with some new insight about your citizens, 'smart cities' can simply be about being smarter with what you already have. That is why here at Future Cities Catapult we have colleagues who specialise in service design and user insights sitting along side 'stack developers' and professional urbanists.

For example, we did some work in the Brazilian city of Belo Horizonte. The city had an existing but poorly used bus rapid transit system and wanted to see how technology might improve its usage.

Before introducing any form of technology solution, our team followed a cohort of public transport users in the city over the course of a week using travel diaries, workshops and interviews to understand how they felt about the information that was available to them about their mobility options, how easy it was for them to get to and from their buses, and any issues they experienced while at the bus stops or onboard.

Overcrowding and the irregular frequency of buses arriving at the station were identified as the most common pain points discouraging users from making use of the BRT. Using this new insight and drawing on expertise from British SMEs, the transport authority was able to make changes to its station signage to improve information about when buses were due, better plan the intersection of local and rapid services, and publish data about how crowded or otherwise

services were, enabling users to make informed choices about whether or not to take the bus.

Because of this human-centred approach, complimented by some simple technology solutions, the city authorities – and their citizens – are now able to enjoy improved mobility services without having built any new roads or bought any more buses. A solution that has improved productivity as well as being good for the public purse as well as contributing to the liveability of the city.

### **So in in summary...**

Cities are where people live, work, play and learn.

They are complex, organic and wonderful.

They need help to maintain the delicate balance between the benefits of urbanism and its drawbacks.

The UK has a track record of helping the world's cities adapt and embrace change.

A new era of opportunity stands before the UK's Advanced Urban Services sector. Just as gaslights tackled Victorian public safety issues and high-tension lift cables unlocked new building heights, allowing more people to live and work in cities, so too do today's urban innovations promise not only to improve the lives of citizens and deliver efficiencies in public administration, but also to create new opportunities for businesses and more productive places where everyone can prosper.

Future Cities Catapult is here to help UK plc realise that opportunity – as exemplified by the coming three days of aspiration raising, innovation showcasing, and market brokerage.

I hope you find it an exceptionally fruitful event.

**ENDS**