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# **Urban Transformation through National Innovation Competitions: Lessons from the UK's Future City Demonstrator Initiative**

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# Urban Transformation through National Innovation Competitions: Lessons From the UK's Future City Demonstrator Initiative

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## Abstract

Around the world, local innovations in the management and development of urban space are often significantly shaped by national government competitions. This article argues that the competition is a characteristic but underdiscussed feature of contemporary national policy-making on urban innovation, and considers how such competitions might be more constructively implemented in future. It does so by closely tracing the outcomes of one paradigmatic example: the UK's Future City Demonstrator competition, launched in 2012, which awarded funding to four cities (Glasgow, Bristol, Peterborough and London) to implement their proposals. The analysis offers lessons for similar competitions by highlighting six factors which co-determined the implementation and outcome of this initiative: asserting the need for speed; conflating export opportunities with local benefits; focusing on the need for institutional reform; reliance on cross-sectoral collaboration; positioning the 'city as a platform for digital solutions; and a lack of integration at national level. Relatedly, we urge commentators to adopt a critical distance from justificatory assertions of urgent urban crisis and local governments being straightforwardly in need of reform.

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## **1. Introduction**

Since the millennium, a growing number of governments have instigated national competitions to support and accelerate urban transformations and, thus, to enable cities to prepare better for the future. Such initiatives – as detailed further below – differ in their immediate goals, conceptual language, and overall labelling, but have in common the desire to catalyse innovation in the uses of green and, increasingly, digital technologies. We contend that this enabling role of national government has often been underplayed in commentaries on related city-level activities and urban development projects.

The current article draws attention to the widespread significance of national competitions as a policy mechanism for stimulating urban innovation, and then closely traces the implementation and varied local outcomes of one such initiative: the Future Cities Demonstrator competition (FCDC), instigated by the UK government in 2012. The FCDC provides a useful case study since, as will be discussed, its goals and conceptualisation were reflective of various tendencies in a wider set of analogous initiatives around the world. By exploring and explaining the causal outcomes of this particular example, the article aims to draw broad lessons for similar initiatives elsewhere. Such lessons are important insofar as national funding competitions are a significant contemporary means by which globally circulating imaginaries of the urban future are ‘hybridised’ and translated into practices in individual cities (Davoudi et al., 2018; Stone, 2017).

The article first reviews the significance of urban innovation competitions as contemporary articulations of national innovation policy-making. Next, it introduces the FCDC as a paradigmatic case, and explains the methods used to trace its detailed outcomes in four cities. The findings of this tracing process are then presented, with local outcomes compared and analysed in relation to the way this competition was set up. Building on this analysis, the conclusions reflect on possible lessons for analogous initiatives elsewhere and in the future.

## **2. National Urban Innovation Competitions**

The present research proceeded from the grounded assumption that the academic and grey literature on new approaches to urbanism often fails to recognise the shaping roles and prevalence of related national policy drives. Certainly, at least in what Amin and Thrift call the urban ‘agglomeration literature’ (Amin & Thrift, 2017, p.116) – whether considered in terms

of pro-urban policy and ‘place branding’ documents, or more scholarly work advocating the economic benefits of spatial concentration (see eg: Florida, 2002; Glaeser, 2011; Scott & Storper, 2015) – there is often little sense that an overarching national framework has shaped local achievements. This literature more obviously rehearses a wider body of contemporary discourse in which cities themselves are presented as having newly found agency in a globalised world. In emphasising cities’ new abilities to ‘make things happen’ relative to previous eras, and in the face of perceived national governmental impotence, this ‘urban age’ rhetoric may often obscure or take for granted the ongoing importance of national authorities (Swyngedouw, 2016) in providing overall regulatory frameworks, as well as their ‘covert’ power (Lukes, 2005) to set and delimit agendas.

To direct attention to the shaping roles of national policies and institutions here, we recast the development of novel and ‘best practice’ approaches to city management as ‘urban innovations’. With reference to other spheres of activity, the academic field of innovation studies has made wide use of the concept of the ‘national innovation system’ since the 1980s (Chaminade, 2018), in attempts to acknowledge and specify the “distinctive national character” (Nelson, 1992) of contexts with differentiated abilities to foster technical, scientific, and commercial innovations. These distinctive characteristics have often been theorised in terms of path dependencies related to conditions including education systems, cultural habits, the roles of scientific institutions, historical economic activities, and government policies (Carlsson, 2006). For policy-makers, the possibility of actively reconfiguring these conditions is an appealing one, and over time national governments have therefore targeted efforts towards steering innovation, away from passive laissez-faire approaches on the one hand, but also from blunt command-and-control policies on the other (Etzkowitz & Leydesdorff, 1995). Particularly in relation to newer forms of technology, this has involved attempts to broker new types of cooperative alliances between different sectors, at local, regional or national level, but also across national borders (Etzkowitz & Leydesdorff, 2000). While, then, under current conditions of economic globalisation, it is common to talk of the internationalisation of innovation when viewed as a corporate activity, national institutions remain important actors in shaping whether innovations contribute to economies in one place rather than another (Carlsson, 2006). Our claim is not that national innovation policies are always the primary drivers of variously styled ‘future city’<sup>1</sup> projects around the world; nor that policy-centric analytical frameworks which foreground hierarchical agency can fully capture or explain what emerges on the ground. More simply, we propose that the role of national governments needs

to be more clearly acknowledged and explored in attempts to understand the conditions through which innovative urban practices emerge, and, equally, to diagnose the reasons for limited progress in particular places.

This article draws particular attention to the prevalence of *competitions* as a characteristic articulation of national urban innovation policies, whereby central governments attempt to enrol city governments into wider policy strategies aligned with national goals. They function by inviting urban authorities to submit bids for funding, accreditation, or other resources, and often also involving them in networking aimed at knowledge transfer and ‘good practice’ sharing. These initiatives should therefore be distinguished from discrete large-scale transformational projects such as ‘eco-city’ developments directly funded or enabled by national governments – many of which are high-profile, e.g. Masdar City in the United Arab Emirates (see eg Cugurullo, 2013) or Tianjin Eco-City, implemented jointly by the Chinese and Singapore governments (Caprotti, 2015)<sup>2</sup>. They also differ from broader policy programmes, such as the South Korean ‘u-eco-city’ programme (see Yigitcanlar & Lee, 2014), or the UK’s Low Carbon Homes initiative (Greenwood, 2012), which provide direct state funding for innovative urban construction projects, but form part of mainstream planning legislation. Equally, the characteristic focus on local authority participation demarcates them from national urban ‘ideas competitions’ targeted at particular technical experts. One example of the latter, among many, is the recent ‘Cities of the Future’ competition by Russia’s Ministry of Construction, which invited architects to propose improvements to public spaces across 40 Russian cities (DOM RF, 2017-18).

We contend that such competitions represent a characteristically 21<sup>st</sup>-century governance mechanism through which national governments attempt to shape urban innovations. To this end, it is instructive to contrast the UK government’s recent ‘Garden Communities’ scheme (Table 1) with its post-WWII drive to build ‘new towns’ – both of which aimed to ease housing shortages. While the older programme was characterised by centralised top-down planning and funding, the Garden Communities initiative has invited competitive bidding, and in place of a “single template” imposed from above, encourages “innovative approaches and solutions” that will allow new communities to “establish a clear and distinct sense of identity” (DCLG, 2016, p.6). Equally, one can draw a contrast with 20<sup>th</sup>-century national exhibitions and ‘World Fairs’, at the time central components of government-led programmes to stimulate the envisionment of urban futures and demonstrate national innovations, but almost never structured as competitions (Kargon et al., 2015).

While our focus here is on national initiatives, it should be noted that urban competition policy mechanisms have also been implemented at other scales. In 2019, for example, the European Commission's 'Intelligent Cities Challenge' invited cities to submit proposals to "promote the development of powerful high-tech innovation ecosystems" (TED, 2019), with cities "supported to act as levers for industrial modernisation and the transition to circular economy, clean technologies and resource efficiency" (European Commission, 2019, p.7). This competition built on the earlier 'Digital Cities Challenge', which, according to its promoters, "empowered 41 European cities to become Digital and achieve strategies for smart growth and industrial modernisation through the use of advanced technologies" (European Commission, 2019, p.6). The new competition aims to include as many as 50 further EU cities, and 10 outside the EU (ibid, p.8). Other competitions operate at city scale only. The 'CDMX Challenge Innovation Contest' in Mexico City, for example, ongoing at the time of writing in 2020, aims to find IT solutions to the city's challenges in the areas of circular economy and urban mobility: the competition is supported by the city's government, but was instigated by Finnish digital innovation Ultrahack in association with various industrial partners (RETO CDMX, n.d.). Also outside the scope of this paper, competitions are often run to select design teams for specific publicly funded developments such as new buildings and civic spaces (White, 2014).

The growing use of national competitions, as featured in Table 1, aligns contemporary policies on urban innovation with a broader pattern of social and economic national policy drives which incentivise, rather than mandate, local authorities to implement or trial particular new approaches to solving social problems or reviving local economies. Our analysis therefore takes inspiration from critical commentaries on this broader tendency within policy-making towards what can be called 'governance by competition'. Given that local authorities are not obliged to participate, and often actively welcome the chance to imitate (Czarniawska, 2004) apparent best practice from other cities in processes of horizontal 'fast policy transfer' (Peck & Theodore, 2015), such initiatives may be construed as constructive and enabling additions to mainstream policy-making, providing welcome extra sources of income or reputation. Alternatively, however, such initiatives have been interpreted in rather more coercive terms (DiMaggio & Powell, 1983). For example, as Clarke and Cochrane observe with reference to the UK, the choice to participate belies the possibility that "Local Authorities and other local actors may be desperate for the additional funding on offer through various bonus and compensation schemes" (2013, pp. 14–17). Thus, they argue, such economic incentives work as a form of control: while promising to enable local decision-making, they are framed by particular visions of 'good conduct'.

In order to situate our specific case study within a wider international landscape, prominent examples of national urban innovation competitions from different countries are provided in Table 1.

**Table 1: National Urban Innovation Competition Programmes Implemented Since 2000**

Country	Lead governmental organisation at time of announcement	Name	Year of announcement	No. of local authority areas selected as winners
Canada	Infrastructure Canada	Smart Cities Challenge	2017	4
China	Ministry of Housing and Urban-Rural Development	Low Carbon Eco-City	2009	16 (as of 2015)
	Ministry of Environment Protection	Eco-City Standard	2003; revised in 2005 and 2007	103 cities, districts and counties (as of 2015)
	Ministry of Housing and Urban-Rural Development	Smart City Pilot	2012	103
France	Ministry of Ecology, Sustainable Development of Transport & Housing	ÉcoCité	2008	29 cities to date
	Ministry of Ecology, Sustainable Development of Transport & Housing	ÉcoQuartier	2008	486 neighbourhoods to date
Germany	Inter-Ministerial Working Group for Sustainable Urbanism	Future City ( <i>Zukunftsstadt</i> )	2015	8
India	Central Pollution Control Board	Eco-Cities	2002	6
	Ministry of New & Renewable Energy	Solar City	2008	60
	Ministry of Urban Development	Near-Zero Energy Satellite Towns	2010	8
	Ministry of Urban Development	100 Smart Cities Mission	2015	99
Japan	Ministry of Environment, and Ministry of Economy, Trade and Industry	Model eco-city	2008	13
	Cabinet Office	FutureCity	2011	11
South Korea	Ministry of Land, Infrastructure, and Transport	Smart Challenge	2016	14
UK	Department for Communities & Local Government	Eco-towns	2009	4
	Technology Strategy Board	Future Cities Demonstrator	2012	4
	Ministry of Housing, Communities and Local Government	Garden Communities	2016	28 to date
	Department for Transport	Transforming Cities Fund	2018	12 in current preliminary round of funding
US	Department of Transportation	Smart City Challenge	2015	5
	White House	Smart Cities Initiative	2015	20+

These competitions, then, are all examples of a single national government innovation drive aiming to shape urban transformation in a series of cities. Not all of them have translated into implementational success. The Indian Eco-Cities scheme, for example, was widely criticised for failing to deliver on its goals (Joss & Cowley, 2017); the UK’s eco-towns programme, meanwhile, was largely abandoned following a change of national government in 2010 (Tomozeiu & Joss, 2014). But while some can be interpreted as opportunistic or insufficiently embedded within longer-term planning, it remains interesting that the competition *mechanism* has repeatedly been adopted, and can itself be understood as an example of ‘mobile’ policy-making. South Korea’s ‘Smart Challenge’, for example, which has invited local authorities to apply with private companies to solve urban challenges, prominently acknowledges the inspiration it took from the US Smart City Challenge competition (Smart City Korea, n.d.).

Many of the initiatives above, moreover, have expanded over time. Following its announcement in 2003, for example, the Chinese Eco City Standard scheme had grown by 2015 to provide recognition and support to 103 cities, districts and counties, with regular competitive bids for local governments to be awarded ‘model city’ demonstration project status (de Jong et al., 2016). Through China’s parallel Low Carbon Eco-Cities scheme, developed from an earlier Eco-Garden City programme, its Ministry of Housing and Urban-Rural Development collaborated with the US Department of Energy to fund competitively the development of green infrastructure in six Chinese cities in 2013, and with the European Commission to support a further ten in 2015 (de Jong et al., 2016). South Korea’s Smart Challenge, which awarded funding for projects in 14 cities and towns in 2019, has been followed up in 2020 by a second competition inviting local authorities to submit applications in partnership with universities or private companies (Smart City Korea, n.d.). Similarly, Japan’s initial selection of 13 ‘Eco-Model Cities’ in 2009 was extended to include a further 10 in a second phase running 2012-13 (Joss & Cowley, 2017). In turn, this also inspired the parallel FutureCity programme, established in 2011, whose thematic focus was more directly oriented towards socio-economic development (Promotion Council for the ‘Future City’ Initiative, 2014, p.3; Regional Revitalization Bureau, 2014, p.4). This continuity has been achieved despite several changes of the Japanese national government. Likewise, as of 2020, and despite changes of government and the ministries responsible, as many as 486 urban districts have been accredited to the French ÉcoQuartier scheme (Démarche ÉcoQuartier, n.d.), growing from an initial competition involving 14 projects in 2008-9 (Joss & Cowley, 2017). It should additionally be noted that, through the process of application, engagement with these competitions – and therefore, potentially, their influence – extends significantly beyond the winning cities. For example, as many as 160 cities and towns applied in the first round of the ÉcoQuartier scheme; Germany’s eight Future Cities competition winners were selected from 23 applicants; 78 cities entered the US Smart City Challenge; 57 bids were submitted for the UK’s eco-town programme.

The content and scope of these competitions vary considerably. Typically, proposals are invited across one or more broad themes, and then assessed using criteria related to an overall stated rationale. Germany’s Future City Competition, for example, launched by an inter-ministerial group in 2015, and part of a wider ‘Future City Innovation Platform’ national policy programme, invited proposals around five themes: affordable housing; climate adaptation; sustainable mobility; digitisation; and energy provision (Federal Government, n.d.). The eight winning proposals were selected with the help of an independent expert jury. Japan’s Model

Eco-City scheme (led by the Prime Minister's Cabinet Office, and similarly making use of independent experts to help select winning entries), invited locally tailored proposals on five themes: compact city development, public transport infrastructure, the energy performance of residential buildings; renewable energy, and carbon sequestration (Murakami, 2008).

Only in some cases (e.g. the UK's eco-towns) is the aspiration to construct new urban areas. Far more commonly, the emphasis is on stimulating and supporting specific *projects* defined by local authorities themselves. These projects tend to be sector-specific (as in the US Smart City Challenge, which focused on transportation), organised around particular technologies (eg solar energy in India's Solar City programme), or oriented towards the regeneration or partial retrofitting of particular urban areas (as in France's *ÉcoQuartiers*). This channels the longstanding tendency, observed in the UK and many other countries, for urban authorities to adopt a 'piecemeal' approach (Hall & Hubbard, 1996) to contemporary urban redevelopment – an approach proceeding alongside or in place of more comprehensive planning systems, often reliant on discrete pots of funding, and expected to be delivered through collaborative partnerships (Pierre, 1998).

Certain other broad commonalities are observable across the varied examples. First, as Table 1 suggests, the labelling of competitions has shifted over time, away from the 'eco' and towards the 'smart', indicating a growing interest in the potential for digital technologies to resolve urban problems. This is aligned with contemporary trends for 'smart city' approaches to be increasingly prevalent in urban sustainability policies (Caprotti, 2015; Haarstad & Wathne, 2019).

These competitions are also commonly conceived as a form of economic stimulus. In placing hope in cities as drivers of innovation-led economic growth, it is significant, for example, that the French *ÉcoCité* and *ÉcoQuartier* initiatives were launched in partial response to the global financial crisis of 2008, as part of a wider €1bn national economic stimulus programme. Similarly, as will be discussed, the UK's Future City Demonstrator competition was clearly oriented towards resolving problems related to the economic downturn of the time, including reduced local authority capacity following budget cuts. The particular political contexts from which individual competitions emerge do not only reflect economic conditions, however. Japan's Eco-Model City scheme was extended in 2012 explicitly as a response to the devastating earthquake and tsunami of 2011 (Japan for Sustainability, n.d.). The aims of India's Smart Cities Mission are closely tied up with the present government's nationalist agendas (Datta, 2019). The initiation of the UK's eco-towns initiative is more readily explained as a

contribution to wider policy strategies on housing provision and the reduction of CO<sub>2</sub> emissions – and its abandonment as a national programme had an explicitly political explanation, in the devolutionary drive following the change of government in 2010 (Tomozeiu & Joss, 2014). But across these competitions as a whole, the ‘city’ tends to be imagined and mobilised primarily in its role as economic driver and innovation hub; and it is noticeable that only in some cases are national urban innovation competitions driven by land use planning ministries.

Relatedly, they are widely characterised by the goal of encouraging new ways of working within and between local authority departments, and in collaboration with other local stakeholders. The goal of encouraging new types of cross-sectoral partnerships resonates with general tendencies within national innovation systems policies (Wittmann et al., 2020), including the ‘triple helix’ approach (Etzkowitz and Leydesdorff, 2000). It is mirrored, too, in many urban sustainability initiatives which rely on varied multisectoral partnerships for delivery (see eg: Joss et al., 2013; Koppenjan & Enserink, 2009). As other commentators have observed, the need for new ‘transformative’ forms of more networked, collaborative governance is also a repeated and pronounced assertion across a wide range of policy initiatives and academic literature around smart urbanism particularly (Joss et al., 2019; Meijer & Bolívar, 2016). This asserted need is closely intertwined with the thematic content of many programmes, whose ‘experimental’ ambitions relate as much to trialling new governance approaches as to technologies themselves (Raven et al., 2019).

In short, we propose that national competitions are an increasingly popular mechanism through which contemporary urban innovation policy is exercised, and that they have a significant role in shaping transformative ‘future city’ activities on the ground. We might still ask questions, however, about the effectiveness of this mechanism, and particularly whether the innovations thus stimulated have gone on to catalyse wider urban change. By closely examining one particular example (the FCDC) which displays characteristics in common with other national urban innovation programmes, the present article identifies opportunities for other national initiatives to achieve more convincing urban transformations in future. The examination is guided by two overarching research questions in relation to the case of the FCDC. First, *to what extent did this national competition lead to urban transformation (understood as engendering innovation, tangible outcomes and a legacy)?* Second, to build on Taylor Buck and While’s (2017, p.516) observation of the competition’s underlying ‘logic around empowering local government to orchestrate innovation’ at its inception, we ask *to which extent this national competition actually enabled local authorities to do so.*

The following section provides essential contextual information about the FCDC as a ‘paradigmatic’ (Flyvbjerg, 2006) case, and explains the ‘process tracing’ method used to identify its causal outcomes.

### **3. Methods: Tracing the Outcomes of the Future Cities Demonstrator Competition**

#### **Background to Case Study**

The FCDC was launched in 2012, under a Conservative-led coalition government, with the goal of accelerating digital urban innovation across the UK and thereby ‘demonstrating’ the UK’s prime position in the global ‘smart city’ market (TSB, 2012). Its UK-wide launch resulted in over 50 cities putting forward initial proposals, of which 30 were awarded £50k each in support of developing feasibility studies (TSB/Arup, 2013). 29 cities went on to submit bids (see Appendix 1). In January 2013, Glasgow was announced as the winning city, and was awarded £24m to implement its proposals. Shortly afterwards, Bristol, London and Peterborough were also each given £3m as runners-up. All project implementation was due to be complete by 2014 (though this was later extended into 2015), and the participants’ experiences were later shared in a series of end-of-project ‘transferable lessons’ events, coordinated by Innovate UK (formerly TSB), and hosted across the four cities between November 2015 and March 2016 (Saraf, 2015).

For several reasons, the FCDC is a ‘paradigmatic’ example of the national urban innovation competition, as characterised in the previous section. First, it aimed to engender catalytic projects proposed by local authorities themselves. Second, it explicitly aimed to serve an economic strategic goal - that of boosting the UK’s export capacity. This was to be expected, given that the competition was launched by the national innovation agency (the Technology Strategy Board) sponsored by the Department for Business, Innovation and Skills. Third, it reflects the overall trend noted above for national urban innovation competitions to focus increasingly on smart technology – indeed, in the UK context specifically, the FCDC has been described as a seminal moment in the production of a wider national discourse of smart urbanism (Caprotti & Cowley, 2018). The smart city framing further supported the programme’s economic rationale through the wider promise that digital technologies have potential to improve local service efficiency with lower operational costs (Pollio, 2016; Rossi, 2016; Shelton et al., 2015; and see for example LGA, 2015). This was particularly significant in a context of increasing fiscal austerity in the UK, following the 2008-9 global economic crash. Finally, it displayed strong normative expectations that funded projects would be

delivered through new forms of collaborative governance, resting on justificatory assertions about the need to transform governance practices if the successful future of contemporary cities is to be assured. Indeed, the claim that existing local government institutions and processes are in urgent need of updating was central to its rationale. Governance questions were foregrounded, and explicitly interwoven with the need to make cities ‘future ready’ through the development of technological solutions to urban problems:

the complexity and the pace of change, combined with the need for integrated and systemic solutions, are presenting a major challenge to local authorities, who traditionally have developed responses in ‘siloed’ fashion. This requires organisational change as well as deploying innovative technology, and the Technology Strategy Board (TSB) has sought to provide support to cities, developing more integrated approaches, by providing a platform for UK businesses to develop solutions they require. In 2012, it launched a competition to invite cities to develop feasibility studies, in preparation for a competition to fund a large scale Future Cities Demonstrator. (BIS, 2013a, p.6)

To meet the challenge thus framed, the FCDC placed emphasis on ‘demonstrat[ing] at scale, and in use, the additional value that can be created by integrating city systems’ (TSB, 2012, p.2) while concurrently insisting that ‘integration...will not happen without cross-departmental co-ordination and engagement with wider industry, academia and citizen stakeholders’ (TSB/Arup, 2013, p.38).

To date, the implementation of Glasgow’s winning proposal has attracted some attention in the academic literature. Caprotti (2019), for example, analyses the city’s new ‘Operations Centre’ as a symbolic ‘flagship space’; others have argued that public engagement in related activities has been superficial (Borkowska & Osborne, 2018; Calzada, 2017; Cowley et al., 2018; Leleux & Webster, 2018; Viitanen & Kingston, 2018). Some of the FCDC-related activities in all four cities were also documented in an earlier report on ‘smart-eco’ initiatives more generally in the UK (Caprotti et al., 2016). However, the wider implementation and impacts of the FCDC have not been systematically investigated and analysed, beyond Taylor Buck and While’s (2017) reflective study of its progress up to the 2013 funding announcements. Taylor Buck and While concluded that many of the 29 submitted proposals displayed relatively little innovation, often repackaging initiatives already underway, and questioned the competition’s underlying assumptions around local governments’ abilities to innovate and collaborate with the private sector in the ways envisioned, particularly in the light of reduced capacity during an economic recession. They located the competition, in line with our own conceptualisation, within a wider set of UK national innovation policy drives, and highlighted its aim to ‘stimulate creative thinking both within local government and between local governments and relevant private-sector partners’ (p.502). They also suspected that its focus

on export markets was potentially in tension with the goal of ‘delivering benefits to cities’ (p.515). The present article takes the opportunity to build on Taylor Buck and While (2017), by empirically investigating the tangible effects of the competition after funds had been awarded. The empirical focus here is therefore on the local processes of implementation and their legacies.

### **Process Tracing**

The FCDC’s characteristics raise questions about how its effectiveness might usefully be evaluated. It did not prescribe the specific activities which were to take place in each city, nor the organisational forms to govern their implementation – beyond the asserted need for ‘systems integration’ noted above. The establishment of an innovation competition does not guarantee that any resulting innovations will be taken up more widely (and even when experimental initiatives fail, they might still engender social learning). Equally, the longer-term relevance or duration of the activities engendered may be shaped by unexpected external events (as in the case of Japan’s Eco-Model City, as mentioned above); successes claimed by the parties involved may be entangled with wider enabling contexts, or may have been achieved even without the competition. Thus, to gain clarity about what the FCDC achieved, and enable scrutiny of possibly over-inflated claims of success, a ‘process tracing’ method was adopted to chart the sequential implementation of the FCDC over time and within individual contexts. This method was well matched to the task since it enabled the identification of direct causal links between the competition and innovations in both practices and governance in each city.

Process tracing – or ‘causal process observation’ – is an established tool of qualitative analyses, aimed at examining trajectories of change and causation through systematic, sequential description of a given phenomenon (see Collier, 2011; also Bennett, 2010; Mahoney, 2010). The careful description of specific events or situations, at one point in time, is a precondition for establishing causal inference: ‘the descriptive component of process tracing begins not with observing change or sequence, but rather with taking good snapshots at a series of specific moments. To characterize a process, we must be able to characterize key steps in the process, which in turn permits good analysis of change and sequence’ (Collier, 2011: p.824). Rather than providing proof of causal relationships in the manner of a statistical test, it potentially provides insights into causal mechanisms (Kay & Baker, 2015; Lorentzen et al., 2017). Process tracing allowed us to overcome the problem, common in the field of policy analysis, that readily available data are ‘fragmented and not conveniently additive’ (Kay &

Baker, 2015, p.2), in order to produce a solid evidence base for systematic comparisons of outcomes in a series of location.

In the context of this research, process tracing was carried out at the level of the national competition, and particularly at individual city level. It involved systematically establishing and documenting key decisions and actions along the implementation trajectories. This ‘detective work’ (Ricks & Liu, 2018) identified specific, single documents which were key to establishing causal relations, especially given obvious processes of hybridisation whereby the FCDC became enmeshed with pre-existing local governance arrangements. For example, tracking down official records (‘minutes’) of council meetings and budget statements on several occasions resulted in single pieces of information – otherwise not available in summative project reports and promotional materials – which were key to drawing causal inferences. Appendix 1 lists the key sources identified during the process tracing exercise.

The results of the process tracing have been used to construct detailed histories of the genesis, implementation and subsequent legacy of the local FCDC programmes in each city, which are outlined and then compared below. These findings allow for a direct comparison of the local governance and practice innovations which emerged as a result of the FCDC – but it should be noted that they do not attempt to evaluate the implications of these innovations for wider questions of urban performance (for example, quality of service provision, environmental conditions, economic gains, social equity, etc). Nor is the aim here to provide in-depth understanding of local actors’ motivations for participating in competitions: further research in the UK or elsewhere might usefully achieve this through personal interviews once causal facts have been established.

#### **4. Findings and Analysis**

The process tracing approach, based on the source materials listed in Appendix 2, helps reveal and clarify for each of the four cities: (1) how the FCDC initially ‘landed’ within the pre-existing local urban contexts (to 2012); (2) what urban transformations – concerning new (collaborative) governance arrangements as well as new urban initiatives – were attempted and effected during the main implementation period (2013-2015); and (3) what follow-on developments ensued in the wake of the FCDC (2016 onwards). The related findings are presented accordingly, first, with focus on each of the four cities, followed by comparative analysis and, finally, with a discussion of six underlying factors and lessons that may inform the wider debate of the role of national innovation competitions on urban transformations.

Table 2 provides a comparative overview of the varying interventions of the FCDC across the four local contexts; it should be read alongside the individual city sections that follow.

**Table 2. Local implementation of Future City Demonstrator initiative across four cities: Glasgow, Peterborough, Bristol, and London**

	FUTURE CITY GLASGOW	Local 'smart city' context	PETERBOROUGH DNA	Local 'smart city' context
2009-2012		Glasgow Operation Centre (phase 1 investment)		(No prior activity)
2013-2015	<p><u>Policy</u> Open Manifesto: Future City Principles City Technology Platform</p> <p>Major investment in </p> <p><u>Project activities: OPEN Glasgow &amp; Demonstrators</u> Active Travel / Citizen Engagement / Dashboards / Energy / Engaging the City / Intelligent Street Lighting / Linked Mapping / My Glasgow / Open Data Catalogue / Social Transport / Community Mapping / Future Makers / Hacking the Future</p>	<p><u>Organisation</u> <b>Glasgow Operation Centre (2014—)</b></p>	<p><u>Policy</u> Delivering a Truly Smart City Innovation Challenge &amp; Test Bed</p> <p><u>Organisation</u> Peterborough DNA</p> <p><u>Project activities</u> OpenCity Screen demonstrator / Brainwave Portal / Hackathon / Innovation Week / GreenHeart / iDream / Local Roots / Peterborough Reuse / Screen Reader / Heatlight / Solar Power / Global Air Dynamics / Urban Observatory</p>	(No parallel activity)
2016-2018	Future City Glasgow Evaluation (2017)	Glasgow Operation Centre (additional funding)	... scaling-up through 	<p><u>Organisation</u> <b>Future Peterborough (2016—)</b></p> <p><u>Project activities</u> Digital city / Alcove / Open+ / Peterborough Graduate Scheme / Bursaries / Weather Station / Repurpose, reuse and share / Remanufacture / Redesign / Rethink / Repair / Recycle / Recover / Smart Fengate / Smart City leadership programme / Circular City programme / Instant Atlas / Customer Experience Programme / Internet of Things / Dragon Patcher / Smart Supper</p>
	CONNECT BRISTOL	Local 'smart city' context	LINKED LONDON	Local 'smart city' context
2009-2012		<p><u>Organisation</u> <b>Connecting Bristol (2006—)</b></p> <p><u>Policy</u> Smart City Bristol (2011)</p> <p><u>Project activities</u> B-Open / Media Sandbox competition strand / Open Data Bristol / Gigabit Bristol / ...</p>		<p><u>Project activities</u> London Datastore (2010)</p>
2013-2015	FCD award as co-investment in 	<p>... Playable Cities Award / Democratree / YouDecide / MyKW-MyBristol</p> <p><u>Organisation</u> <b>Bristol is Open (2015—)</b></p> <p><u>Project activities</u> Data Dome / ...</p>	<p><u>Project activities</u> Agile Urban Logistics / Networked Utilities / Work &amp; Volunteering Platform</p>	<p><u>Organisation</u> <b>Smart London (Board)</b></p> <p><u>Policy</u> Smart London Plan / The Future of Smart (update 2016) / New Smart London Plan (consultation 2017)</p> <p><u>Project activities</u></p>

				Smart London Innovation Networks / London Living Lab / Smart London Districts Network / Smart London Infrastructure Network / QE Olympic Smart Park / Civic Crowdfunding / Infrastructure Mapping Application / Talk London ...
2016-2018		... IoT Mesh / Wireless Mile / Software Defined Network Control  Healthy Office REPLICATE Operations Centre	Additional: Bunhill Smart Energy Project / ... ... Innovation Accelerator	... Tech Londoners / Speed Volunteering / CityDatastore / Smart London Camp <u>Policy</u> Data for London: A City Strategy for London <u>Organisation</u> London Chief Digital Officer / London Office of Data Analytics / London Office of Technology & Innovation

### *Future City Glasgow*

According to the UK government, Glasgow's FCDC programme was deemed to have demonstrated significant impact: it claimed a return of investment of £144m (OSSS, 2017). Indeed, as overall competition winner, the city was able to implement 'Future City Glasgow' in full and garner recognition across the UK and beyond. Closer analysis, however, suggests that the initiative's transformative potential and effect need some qualification.

*Pre-existing context (to 2012).* In contrast to Bristol and London, as well as other UK cities (Caprotti et al., 2016), Glasgow had relatively limited prior engagement with the smart city agenda. As such, the FCDC award landed as a major new initiative which, according to the official narrative, resulted in significant innovation and transformation. This claim centres in particular upon the Glasgow Operation Centre: £14m of the total £24m FCDC grant funding went towards this new integrated city management system. It was, then, the single most important element of the initiative's implementation. Process tracing, nevertheless, reveals that the centre had already been pre-planned and the first phase funded (£5.3 million) prior to the FCDC award (GCC, 2012a). Future City Glasgow, therefore, enabled the city to proceed to a second phase centred upon a technological upgrade (e.g. high-definition IP cameras, high-speed communication links) and the co-location of functions in one control room (GCC, 2014; Saran, 2016). Seen in this light, the premise of the feasibility study ('Glasgow City Management System') to 'deliver an additional layer of technology that will accelerate the integration of city systems' (GCC, 2012b), to be achieved through strong leadership, resonates with these pre-existing developments; it further helps explain why the initiative's main intra-organisational focus proved more tangible and lasting than its wider external activities.

*Implementation phase (2013-2015).* Given the focus on the Glasgow Operation Centre, and the need to execute this major programme in a short period of time, the city council took sole charge of implementing Future City Glasgow. Consequently, apart from sub-contracting some activities, the initiative was mainly delivered in house. The operation centre was opened on a permanent basis in 2014, bringing together Community Safety Glasgow and the Traffic Control Centre, as well as partnering with the police and fire and rescue services. The two other, externally oriented strands of Future City Glasgow were the online platform ‘OPEN Glasgow’ (£6.9m) and a series of ‘Demonstrators’ (£3.2m) (GCC, 2015b; mruk, 2017). OPEN Glasgow (2018) described itself as a public gateway to connect with the city based on open access data. It incorporated several data maps, a city dashboard and an app (‘MyGlasgow’) for reporting local problems. Accompanying the online engagement were a series of short-term workshops and hackathons. The ‘Demonstrators’ addressed four themes: energy efficiency; integrated social transport; intelligent street lighting; and active travel (walking, cycling). These encompassed a range of innovations, from the development of apps to the installation of sensors in physical infrastructure, and from user studies to engagement workshops.

*Post-implementation phase (from 2016).* While the Glasgow Operation Centre was by now permanently established, the impact and legacy of the two other strands are less clear. There is no direct evidence of the various ‘Demonstrators’ leading to further, linked activities. The ‘OPEN Glasgow’ platform remained available online, with some content added, until 2018 (and since taken offline), but it is unclear whether the underlying data maps continued to be updated during this period. As the evaluation report (mruk, 2017) highlights, funding for Future City Glasgow had to be spent by 2015, which posed challenges not only for timely delivery during the implementation phase but, importantly, also for ensuring legacy beyond the project period. Overall, significantly, there is little evidence of organisational continuity and ongoing programmatic innovations, beyond the council setting out an additional budget (£1.05 million) for ‘expanding’ the roles of the Operations Centre between 2016-18 (GCC, 2015a).

### *Connect Bristol*

As widely reported at the time, in 2017 Bristol overtook London as the nation’s ‘top smart city’ in the UK Smart Cities Index by Huawei (Barber, 2017; Woods et al., 2017). This leading position was reflected, in the period analysed, by the vibrancy and variety of local smart city activities, and by the growing governance arrangements supporting these. The FCDC did play an important role in shaping one part of what has happened since 2012, but explicitly drew on

an existing enabling context. As such, the FCDC in this case is best seen as a sideshow to the main arena of smart city activity, Connecting Bristol, which originally gained political support and funding from the council because it was consciously rooted in the city's existing '20:20 Plan' sustainability strategy (Cosgrave et al., 2014, pp.43-44).

*Pre-existing context (to 2012).* Bristol's feasibility study emphasised the ambition to build on existing strengths, including earlier digital and smart activity, experience of collaborative governance, and ongoing attempts to restructure local governance structures. It claimed continuity from the city's existing 'Smart City Programme' based on 'public-private-people partnership' (BCC, 2012, p.11), launched in 2011 (BCC, 2012, pp.7-8) – but expanded the previous programme's narrower focus on carbon emissions and transport (BCC, 2011). The title of the bid (Connect Bristol) appears to echo the name of the umbrella organisation 'Connecting Bristol', established in 2006 (BIS, 2013b), and which continues to link together and promote a wide variety of technology-related activities in the city (Connecting Bristol, 2018a). The feasibility study was therefore essentially framed as an extension of already established activities and ways of working.

*Implementation phase (2013-2015).* In the event, the £3m 'consolation' award was left unused until 2015, when the decision was taken that it should contribute to funding for another initiative: 'Bristol is Open' (BIO). The majority of the funding (£15m) for BIO, however, was to come from the West of England Local Enterprise Partnership (BCC, 2015). The initiative built on digital infrastructure installed using £5.3m of earlier funding from the national Department of Culture, Media and Sport (as part of the Gigabit Bristol project launched in 2012). It now reports a wider base of financial support from local, national and European government, academia, and the private sector (BIO, 2018). Thus, the FCDC funding did perform a direct enabling role in forming the BIO organisation (jointly owned by Bristol City Council and Bristol University) and therefore in its four ensuing activities - but the larger part of BIO's funding came from elsewhere, and it stood on the shoulders of the already established Gigabit Bristol programme.

*Post-implementation phase (from 2016).* BIO was subsequently positioned as one of many activities taking place under the Connecting Bristol umbrella, drawing on varied income sources. For example, in the £25m REPLICATE project, focusing on transport, energy and new uses of existing infrastructure, and funded by the European Union's Horizon 2020 programme, the BIO steering group is just one of eleven contributing partner organisations in Bristol

(Connecting Bristol, 2018b). The majority of projects promoted by Connecting Bristol have no discernible connection to BIO, and a large proportion are oriented towards community engagement, with leading involvement of local NGOs. The Connecting Bristol website continues to report new collaborations and activities, and an ‘operations centre’ has recently opened to integrate the management of traffic, public safety and emergency response systems (BCC, 2017).

### *Linked London*

Not unexpectedly, the contribution of ‘Linked London’ ended up more limited owing to the reduced funding received. However, even if the full award had been made, it is likely that the initiative would still have played a subsidiary role to the more far-reaching ‘Smart London’ initiative. The latter reflects the ambition, power and capacity of London as a world city to engage with the smart city agenda at large scale.

*Pre-existing context (to 2012).* London’s bid for the national FCDC was, then, part of a wider strategy to instigate an ambitious smart city innovation programme (GLA, 2012, p.3). The £24m contribution from TSB for ‘Linked London’ was meant to be combined with £340m of investment anticipated by the Greater London Authority to deliver ‘Smart London’ (GLA, 2018). The FCDC’s specific contribution was to enable a 26 km<sup>2</sup> area-wide investment in East London (GLA, 2012, pp.6-7). The £3m partial funding reduced the scope of ‘Linked London’: instead of a cohesive area-based investment, support went towards five individual, loosely connected components contained in the original bid.

*Implementation phase (2013-2015).* Only three of these five projects were partially implemented during the implementation period (GLA, 2015): (1) Agile Urban Logistics (£1.4m), to address the impacts of fast-growing light-freight road transport through integrated technology solutions – apart from an initial feasibility study, a few small-scale demonstrator projects were funded involving Gnewt Cargo, a London-based electric parcel delivery firm; (2) Work and Volunteering Platform (£750K), to develop an online platform for short-term (‘micro’) work and volunteering opportunities — this subsequently materialised as a ‘Speed Volunteering’ platform in the ‘Smart London’ programme; (3) Network Utilities (£110K), to commission a feasibility study for coordinating utility mapping across London.

*Post-implementation phase (from 2016).* By 2015, the GLA in agreement with the funder decided to spend the remaining grant on two further projects, thus extending the project period to 2018 (GLA, 2015): (4) Bunhill Smart Energy Project (£483K), to digitally upgrade the

existing district heat and power network in the Borough of Islington; and (5) Innovation Accelerator (£229K), to invest in environmental demonstrator projects through an open competition. Overall, then, Linked London did not establish itself as a discernible initiative in comparison with Smart London (GLA, 2018); the latter emerged as a more sustained programme of varied activities, guided by the Smart London Plan, and with advisory input from the Smart London Board. Both the previous and current mayors (Boris Johnson, and Sadiq Khan) put their decisive weight behind Smart London, which has been developed into a major programme of its own and is seen as critical in allowing the city to consolidate its position as global player. In fact, the international dimension is even more explicit under the current mayor, as evident in the new Smart London Plan and the appointment of a London Chief Digital Officer (styled on New York's counterpart) (GLA, 2017). This is accompanied by a stronger emphasis on technological innovation compared with the previous mayor's Smart London activities, which had a more pronounced focus on civic collaboration (GLA, 2016).

#### *Peterborough DNA*

In contrast with London and Bristol, the FCDC competition was a seminal event for Peterborough. It is possible to trace a clear set of causal links between the £3m award becoming available and the diverse smart city activities currently taking place. A path dependency of discourse as well as practice is evident, whereby the city has developed an ongoing programme of activities and instituted an enduring organisational body.

*Pre-existing context (to 2012).* The feasibility study foregrounded the potential to exploit existing strengths in multi-sectoral engagement and partnership working, including the tech-driven 'Peterborough Model for Accelerated Collaboration' (PCC, 2012). Significantly, however, it made no promises to build on an existing programme of smart city activities (as did, for example, Bristol), and no related 'back story' has been retrospectively constructed in more recent documentation. Instead, the council has asserted that the FCDC 'kick-started something special' (PCC, 2014).

*Implementation phase (2013-2015).* The £3m award did not allow Peterborough to implement the larger infrastructural projects proposed in its feasibility study (PCC, 2012). The funding was instead used from 2014 onwards (PCC, 2015; 2016; 2017) to support a series of smaller initiatives, coordinated by the specially formed Peterborough DNA partnership. This programme focused primarily on economic growth, entrepreneurial activity and data accessibility (PCC, 2014), and gave special emphasis to one of the feasibility study's central

intentions: to ‘stimulate export by bringing British solutions to new markets’ (PCC, 2014, p.8). Without the FCDC and its funding, then, there is no firm indication that the council would have coordinated and encouraged the ensuing activities. Doing so, however, enabled a successful application for the Smart City of the Year 2015 award in Barcelona.

*Post-implementation phase (from 2016).* In turn, this award was mobilised as a key ‘smart’ credential in the ‘Future Peterborough’ programme, which explicitly describes itself as a ‘scale up phase’ of Peterborough DNA, beginning in 2016. Meanwhile, the ‘Smart City Leadership Programme’, developed by Peterborough DNA jointly with the British Standards Institute and consultancy UrbanDNA, provided input into the Indian Smart Cities Programme (Future Peterborough, 2018b). In 2017, the city was able to boast visits by potential smart tech investors from Canada (Opportunity Peterborough, 2017a) and representatives from the Taiwanese Commission in London (Opportunity Peterborough, 2017b). The activities associated with the various phases of Peterborough’s smart city programme display a marked degree of thematic consistency over time (in contrast with, for example, London). Peterborough’s commitment to environmental sustainability was foregrounded in its FCDC bid – including its adoption of ‘Environmental Capital’ as a key city policy in 2010, and commitment to ‘One Planet Living’ policy adoption (PCC, 2012). Although the funding award did not allow related demonstrator projects to be implemented, the city reported that it stood out from competitors in the 2015 Smart City of the Year awards because of its more ‘holistic’ approach (Valerio, 2016) through its ‘circular city’ and ‘environmental capital’ visions, and approach to citizen engagement (Opportunity Peterborough, 2015). Environment-focused projects now form a key strand of Future Peterborough’s activities, with eight initiatives launched under its ‘circular city’ label (Future Peterborough, 2018a). Alongside grouped activities aimed at using data to solve broader city challenges, and at demonstrating smart city ‘leadership’, ‘citizen-centric’ projects continue to feature significantly in its ‘People Focused’ policy strand.

### ***Comparative Evaluation of Innovative Practices and Governance Due to the FCDC***

Our evidence suggests that the FCDC has had most tangible transformative effects in Peterborough, but also – to a lesser extent (and in different ways, as will be discussed below) – in Glasgow. During the process of the competition itself, Peterborough’s activities stand out as innovative relative to other cities due to the absence of pre-existing smart city activities and

organisations in the city. Still, there was also some evidence elsewhere of governance innovation being enabled by the FCDC. Glasgow's Operations Centre, notably, entailed the co-location of services facilitated by ICT upgrading. As such, systems integration did occur, but was limited to the Council itself, and only to some services (transport, emergency services, and policing). Beyond this, across all four cities, it is difficult to make a persuasive case that the FCDC empowered local authorities to orchestrate significant innovations in their inter-organisational or external governance processes, despite its explicit aims to overcome 'siloes' government and catalyse collaborative approaches. This is understandable given (a) the paucity of time; (b) relatively low-level interventions, within a wider field of governance/activities; and (c) in the case of Bristol particularly, already established collaborative partnerships.

Looking beyond the end of the FCDC process, Bristol and London's programmes have had relatively limited ongoing impact, either in terms of practice or governance innovation. The reasons for this differ: Bristol, as noted earlier, was characterised by significant pre-existing smart city activity and collaborative governance; London's FCD activities have been absorbed into a more extensive (shifting) programme being developed in parallel by its powerful municipal government. In Glasgow, the Operations Centre more convincingly represents an ongoing legacy – even though this constituted an upgrade of an already planned project. There is ongoing potential for Glasgow to further develop and promote the Operations Centre as a concrete 'demonstration' of successful smart city technology enabling the integration of various city-level systems. Peterborough stands out largely because of the effective assimilation of FCDC into the city's own policy goals and narratives. It has continued to expand and showcase its collaborative activities, and gained international exposure. However, technology itself is arguably not central to what is being 'demonstrated'. Its successes relate more obviously to local regeneration, emphasising environmental sustainability, education and training, local community needs, and supporting local businesses. These priorities formed the focus of the meeting with the Taiwanese delegation, which aimed to provide 'greater insight into Peterborough's citizen-centred Smart City work that won it the title of World Smart City of the Year 2015' (Opportunity Peterborough, 2017b).

### **Analysis: Underlying Causes of Outcomes**

No formal evaluation appears to have been commissioned by the UK government, although a summary report highlights 'how £1.5 million [= £50K x 30 cities] helped cities deliver a £100

million+ investment in their future’ (Innovate UK, 2015, p.1). Despite this investment, and the evidence presented above of project-level outcomes, our overall analysis leads us to question the level of significance and effectiveness of the FCDC as an instrument for catalysing urban innovation and transformation. The limited and uneven nature of its practical outcomes point in turn to a series of questionable underlying assumptions and design flaws. These underlying factors are identified, and their implications discussed, below.

*Factor 1: Asserting the Need for Speed*

At national level, the FCDC was rhetorically justified by the assertion that many contemporary UK cities are in a state of crisis. The crisis referred to has both a national and global dimension: in the UK, the global financial crisis of 2008 put local government finances under particularly severe strain, forcing efforts to find ways of ‘doing more with less’. Beyond this immediate context, cities were also recognised as having to cope with more long-term, global problems: ‘Cities are struggling with climate change, changes in population and demographics, congestion, healthcare and pressure on key resources’ (TSB/Arup, 2013, p.2). In response, digital innovation was expected to help cities address this two-fold crisis.

A palpable urgency accompanies this rhetoric, whereby ‘it is becoming increasingly clear that we cannot make fast enough progress by optimising the individual components and systems of the city. Innovation in integrated and city-wide solutions is required’ (TSB, 2012, p.2). A similar urgency dictated the FCDC’s programmatic implementation (TSB, 2012, p.4): following initial announcement in February 2012, the competition opened in June of that year, with cities having less than a month’s time to submit their applications. The results were announced in late July, giving the 30 selected cities until November 2012 to carry out and submit detailed feasibility studies. An interim evaluation report noted that ‘the tight time frame of the feasibility assessments and the predominance of qualitative strategic visions mean that it is often difficult to quantify the benefits of the proposals’ (TSB/Arup, 2013, p.47). The four winning cities were subsequently announced in early 2013, expecting the funding awards to be spent by the end of the financial year 2013-14; i.e. April 2014 (TSB, 2012, p.3), although this deadline was later extended to 2015.

This narrative of multi-scalar crises requiring urgent solutions at city level is not unique to the FCDC. Rather, it appears to form a compelling ‘storyline’ which, as Caprotti (2015) observes, is replicated across various fields of contemporary urban development internationally. Recent scholarship, furthermore, largely with reference to the global south, has

shed light on the logics through which speed has thereby become a characteristic guiding principle of contemporary urban transformation (see e.g. Chien & Woodworth, 2018; Datta & Shaban, 2017). Whatever the diagnostic merits of this storyline, we should nevertheless be alert to its rhetorical force: it is not an inevitable starting point for devising urban solutions.

In practice, the urgency invoked by the competition had problematic implications for real-world local implementation. The time limitations had a number of perverse effects which acted against the goal of transformative innovation, including: (a) the need to deliver local activities as ringfenced projects, with limited opportunity to integrate into wider (smart city) institutional and practice contexts; and (b) a lack of continuity and transition planning, resulting in the abrupt ending of many projects and activities. While Glasgow has most obviously illustrated both these outcomes, in both Bristol and London the last-minute diversion of funds to other projects is more readily interpreted as an improvised response to an impractical timetable, rather than as evidencing an integrated programme of activities. Such urgency, however, is not a necessary characteristic of urban innovation competitions. The eight winning cities in Germany's Future City competition, for example, were selected in 2019 through a multi-phase process over a period of four years following the programme launch; France's ongoing *ÉcoQuartier* similarly involves a multi-stage certification process taking place over a number of years.

### *Factor 2: Export Opportunities vs. Local Benefits*

In reference to the overall competition set up, Taylor Buck and While (2017) pointed to a potentially problematic tension between the goals of local regeneration and export opportunities. TSB envisaged that 'a successful future cities demonstrator project will support UK-based businesses to develop new approaches and solutions that can be exported around the globe, and help UK cities to plan and build for the challenges of the future, improving their international competitiveness' (TSB/Arup, 2013, p.3). The hope, according to a government blog on learning from the FCDC, was that local attempts to address this crisis would themselves 'help the competitiveness and sustainability of the UK's cities, and also support the UK businesses offering such solutions through developed [sic] a vibrant home market in which to demonstrate the value of their products and services before taking them to the rest of the world' (Saraf, 2015). We found, in each of the four cities, that this national framing was clearly reproduced through a particular logic which rolled these two needs together, and positioned them as mutually constitutive with the reorganisation of local authority systems. Glasgow, for example, reports the aim to 'showcase how the city can grow its local economy and improve the lives of its citizens by making the most of new technologies and integrating and connecting

city systems' (mruk, 2017, p.19). Bristol's feasibility study hedged its bets, aiming to create 'environmentally and socially sustainable jobs and growth' by creating an integrated Operations Centre and a programme to encourage citizens and businesses to make innovative uses of open data (BCC, 2012, pp.2-3). Peterborough expressed the parallel aims of further enabling local businesses to offer 'solutions across the globe' as well as benefitting 'citizens and businesses through enhanced economic activity and prosperity, life-choice and lifestyle enhancements and a lesser dependency on unsustainable consumption and production cycles' (PCC, 2012, p.1). London's 'overarching objectives', equally, included both solving 'economic, environmental and social challenges in East London' and developing 'global opportunities for SMEs and large firms across the UK' (GLA, 2012, p.12).

Given these intertwined ambitions, it is striking that the overall set of varied activities which the competition spawned in the four cities (Table 2) was predominantly oriented towards improving local services and civic engagement; there is little sense of local programmes ending up focused on, or directly leading to, export opportunities. It is unsurprising that national or local governments should wish to embrace the potential economic benefits of association with cutting-edge urban technologies; and, as a national urban innovation competition, the FCDC is hardly alone in its goal of stimulating economic growth (see section 2). But if the primary underlying purpose of the competition was in fact to stimulate UK exports, the question arises of whether local authorities are the best channels through which this can be achieved. While the competition has allowed Peterborough to gain international recognition, this success may well reflect the fact that the city's economic development company, rather than the local authority per se, has played a central ongoing role; and in any case this recognition primarily rests on its efforts to regenerate the local community.

### *Factor 3: Focusing on the Need for Institutional Reform*

The FCDC's insensitivity to the temporalities and capacities of existing local institutions was accompanied by rather broad-brush assertions that 'cities are...struggling with climate change, changes in population and demographics, congestion, healthcare and pressure on key resources' (TSB/Arup, 2013, p.2), and that governance innovations are required since 'it is becoming increasingly clear that we cannot make fast enough progress by optimising the individual components and systems of the city' (TSB, 2012, p.2). Such claims imply an underlying assumption that current institutions are no longer fit for purpose – and yet the strong narratives through which they are presented were not supported by specific evidence.

Based on our tracing of outcomes, it would be difficult to conclude that the successful implementation was generally possible only when existing governance processes had been reformed. The establishment of the Peterborough DNA organisation as a direct legacy of the competition, in a context where no comparable institution or network previously existed, would seem to support a claim that the competition enabled local authorities to ‘orchestrate innovation’, but is also an exception, and not a response to local government failure. A more obvious pattern emerges whereby implementation has relied on existing, functional institutions and processes. Some further intra-departmental coordination was enabled through Glasgow’s Operations Centre, and yet this was already planned as a project; much of London’s funding was eventually used to support projects enabled by the existing Smart London framework; Bristol’s BIO initiative was mainly funded from other sources, and this in turn was plugged into an already very networked programme of digital urban innovation activities.

These outcomes instead suggest that existing governance (particularly municipal) might more readily be characterised as enduring: its stability over time need not be narrated only as a barrier to good future governance, and ongoing flexible reorganisation of internal structures and external relations is not necessarily a desirable goal in itself. The FCDC’s assumptions may usefully be contrasted with, for example, the French *ÉcoQuartier* competition, which placed emphasis on achieving innovation within existing urban planning frameworks and by drawing on established local government capacity. At least, it seems imprudent to make sweeping claims that current systems and processes are all equally ineffective, or are straightforwardly any more out-of-date than has ever been the case in the past.

#### *Factor 4: Reliance on Cross-Sectoral Collaboration*

The very premise that innovative governance collaborations would necessarily help city authorities provide better services is worth questioning. Indeed, the findings from Nesti’s (2020) previous study of smart city programmes across Europe suggest that the fact of innovative collaboration has not necessarily yielded convincing benefits for city authorities’ ability to govern. Our own findings do lend weight to the proposition that an open-minded approach should be taken to governance structures around urban innovations – or, more precisely, we found that the form and extent of collaboration was highly differentiated across activities and cities. In terms of the involvement of civil society, for example, Glasgow’s approach was strikingly different to that of, say, Bristol; the dominant role of Glasgow council more generally contrasts with the more coordinatory role played by local authorities in Peterborough and Bristol; London’s bid and practical outcomes rested primarily on FCDC

funding being linked subordinately to wider governance processes. Beyond the observation made above, that governance innovation was partly constrained by the short project timelines and the role played by existing local government structures, the more obvious conclusion is that collaborative practices were only one factor among many that shaped actual outcomes, and that collaboration itself has turned out to be a diffuse category.

This raises questions about the emphasis which the FCDC placed on the potential to engender innovative collaborative governance: this was a key criterion in the awarding of funds. Its open-ended approach contrasts with that of, for example, the Japanese Eco-Model City competition, which specified a comprehensive, multi-level governance structure involving particular stakeholder groups, including processes for independent committees to conduct regular evaluations, and thematic working groups to share best practice (Joss & Cowley, 2017). At least, there is no necessary reason to see collaborative partnerships as the cardinal indicator of transformative progress towards the resolution of problems within contemporary cities. Working in partnership with external stakeholders may in fact often indicate little more than the ‘projectification’ of urban development, running in parallel with, rather than directly transforming, mainstream policy and institutional processes; and the desirability of collaborative governance innovation might usefully be distinguished from the ambition of achieve more tangible outcomes (in this case, either around local benefits, or export potential).

#### *Factor 5: Positioning the ‘City’ as a Platform for Digital Solutions*

Given the broader international interest in the potential for ‘smart’ technologies to enable resource efficiencies, more effective service provision, and innovative new approaches to governance (Joss et al., 2019), digital innovation would seem a sensible and motivating theme for a national urban innovation competition. In this case, the wide variety and large number of activities and apps which were instigated, as part of these four programmes or their legacies (Table 2), suggests genuine interest among local authorities to embrace their role as digital ‘urban innovators’.

And yet, our findings do not fully vindicate the overall competition aim of ‘providing a platform’ in the form of urban space ‘for UK businesses to develop solutions they require’ (BIS, 2013a, p.6). A large proportion of activities have taken the form of small-scale or temporary experiments, or been abandoned (as in the case of the OPEN Glasgow digital platform, for example). But even the two most convincing outcomes - the Glasgow Operations Centre and the Peterborough DNA organisation (and its successor, Future Peterborough) – have

different significance in this regard. The technological innovation of the former primarily serves to optimise services and processes which are internal to the local authority; the success of the latter as a platform does not primarily relate to the emergence of business-led digital exports. Bristol's decision to use all funds to support the local university on the BIO project, meanwhile, points to greater confidence in universities as natural spaces of marketable innovation. In parallel, there is little evidence, beyond the example of Glasgow's Operation Centre, that 'integrated and systemic solutions' have flowed straightforwardly from the deployment of 'innovative technology' (BIS, 2013a, p.6), as the national competition originally envisaged in rather abstract terms.

#### *Factor 6: Lack of Integration at National Level*

Given the FCDC's central mission to catalyse the effective integration of various city systems, including governance across local departments and agencies, it is worth noting finally that the initiative itself enjoyed limited integration across central government. This is significant insofar as a review by the sponsoring government department pointed to the risk of a fragmented approach to smart city innovation due to a lack of cooperation among various ministries and, in response, pledged to form an overarching Smart Cities Forum to coordinate policy (BIS, 2013a, pp. 39-40). In reality, no doubt partly as a result of the short implementation period, the FCDC did not extend to other government departments; and, like the national Smart Cities Forum, was not carried forward following the change of government in 2015. A later report on future cities, co-authored by Innovate UK, mentions neither the overall FCDC nor any of the four demonstrators (Future Cities Dialogue, 2017).

This lack of integration is not typical of all national urban innovation competitions. As discussed earlier, programmes in France and Japan have been resilient to multiple changes of government; and Germany's Future City competition has been run with the involvement of as many as 11 federal ministerial domains/agencies, as well as municipal and third sector parties (IMA Stadt, 2017). The involvement of just one governmental department in the UK appears in itself to have constrained the competition's ability to deliver on its central goal of encouraging collaboration across different sectors.

## **5. Conclusions: Lessons for Future National Urban Innovation Competitions**

This article has illustrated the significant role played by national urban innovation competitions in shaping urban transformation projects in cities around the world, and closely examined the documented causal links between one particular competition and its transformative effects (or

lack thereof) on local practices and governance. It has found these effects to be uneven and limited, and has linked these shortcomings to a series of underlying factors in the way the competition was designed and conceptualised. By way of conclusion, we attempt here to draw out some key lessons of potential relevance to national urban innovation competitions more generally.

Our findings suggest that the goals of improving local service provision and boosting export potential were too easily elided, to the detriment of their achievability. We have noted that these ‘translational difficulties’ (Taylor Buck & While, 2017, p.516) were further amplified by the ‘urgency’ of the FCDC timetable. In responding to the asserted need for swift response and implementation in a time of crisis, local authorities did prove capable of commissioning a variety of individual projects; but the rapid timetable remained insensitive to deeper problems associated with integrating institutional ‘systems’, dismissing the entrenched multiplicity and internal heterogeneity of real-world municipal authorities.

In highlighting these limitations, we have not begun with an unrealistic expectation that a single, one-off competition would engender a tangible broader urban transformation. Clearly, this achievement would depend on a much wider range of political, cultural and economic contextual factors. Still, we argue that the practical shortcomings of the FCDC are significant in that they reflect an underlying rationale which drew on a series of reductive and broad-brush assertions. First, that local authorities – presented as a readily identifiable institutional totality – are necessarily in need of systemic reform. Second, that this lack of institutional reform is primarily due to an unwillingness or inability to adapt to changing global conditions (rather than, for example, reduced funding from central government, or longstanding processes of political centralisation). Third, that the surest route to a sustainable urban future, in response to this abstracted problematic, will be secured by the application of equally abstracted principles of collaborative governance innovation and by the promise of new technologies. And, finally, that these two dimensions of the ‘solution’ are co-constituted. Taken as a whole, these assertions institute a particular justificatory ‘storyline’ rather than an inevitable framing of a set of problems and the means to resolve them. The limited nature of the transformational outcomes which our process tracing uncovered suggests at least that other competitions might be wary of adopting its assumptions unquestioningly.

This is not to deny the efficacy of the FCDC in encouraging participation from across the UK – even though the key driver for participation will no doubt often have been the promise of

funding. It is unfair, furthermore, to criticise the competition purely on the basis of a gap between these self-consciously rhetorical ‘calls to action’ and what was achieved in practice. More generously, the FCDC might be evaluated by its success in directly generating experimental approaches to problem solving. However, even in this more limited sense, we found little evidence of an enduring innovation culture except in the case of Peterborough, which has ended up focusing efforts more on local regeneration than, as the government hoped, on the potential to export digital technology and other smart city solutions. The fact of this limited success matters if – as suggested earlier in the article – the FCDC reflects a series of tendencies within urban innovation policy-making internationally, and if national competitions are a relatively undocumented but significant driver of related activities in cities around the world.

What broader lessons might then be induced from this case? First, that in similar competitions it will be reductive to conceptualise the work of local authorities as a ‘system of systems’ which can straightforwardly be integrated overnight – and that even a ‘demonstration’ of this may be impractical in a short time period. The fact that local authorities operate on longer and multiple timescales cannot be wished away. Second, that consequently scale-up and continuity are far from guaranteed. While ongoing effects may always result as much from happenstance as careful planning, the evaluation of similar competition bids in future might usefully include consideration of concrete plans for continuity and ongoing envisaged effects which are not described in abstract ‘integration of systems’ terms. And third, that the fact or promise of collaborative governance innovation need not always be valorised as a necessary means to address urban problems.

These lessons are complemented by the parallel implication that commentators might adopt a critical distance from rationales grounded in notions of crisis and blanket assertions of vaguely defined institutional systems no longer being fit for purpose. From this critical distance, a rather different hierarchy of desirable outcomes might emerge. And if these relate to questions of governance innovation, rather than the potential to export technology, the overall direction of enquiry should point to the bigger question of whether existing, tried and tested, institutional structures emerge in a better position to provide services for local residents.

### **Endnotes**

<sup>1</sup> ‘future cities’ is used here as a broad umbrella term covering differently articulated urban innovation programmes, but also consciously echoes that of the UK’s ‘Future Cities Demonstrator’ competition.

<sup>2</sup> The national governments of China and Singapore directly funded Tianjin Eco-City, but the site was not chosen through an open urban innovation competition as defined in this paper. Rather, the Chinese government used particular criteria first to identify four possible locations, and then to select Tianjin from these.

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## Appendix 1: Applications and funding awards in the UK's Future City Demonstrator competition

Country	City authority	Proposal title	Competition awards
England	Birmingham City Council	Citi-Sense	-
	Brighton & Hove City Council	Brighton and Hove: One Planet Smart City	-
	Bristol City Council	Connect Bristol	£3m (runner-up)
	Cambridge City Council	Cambridge Future City	-
	Coventry City Council	(Feasibility Study)	-
	Derby City Council	Digital Consumer Units	-
	Enfield Borough Council	(Enfield Future City Demonstrator)	-
	Greater London Authority	Linked London	£3m (runner-up)
	Ipswich Borough Council	Smart Ipswich	-
	Leeds and Bradford City Councils (joint entry)	Two Cities: One Place	-
	Leicester City Council	(Leicester Future Cities Demonstrator)	-
	London Borough of Camden	(Camden Future Cities Demonstrator)	-
	Manchester City Council	Manchester Future City	-
	Milton Keynes Council	Future Ready MK	-
	Newcastle City Council	(Newcastle Future Cities Demonstrator)	-
	Nottingham City Council	Smart Energy City	-
	Peterborough City Council	Peterborough DNA	£3m (runner-up)
	Plymouth City Council	(Plymouth Future Cities Demonstrator)	-
	Salford City Council	Smart & Connected City	-
	Sheffield City Council	(Sheffield Future Cities Demonstrator)	-
Southampton City Council	(Southampton Future Cities Demonstrator)	-	
Southend-on-Sea Borough Council	Intelligent City: Future-on-Sea in Southend-on-Sea and Rochford	-	
Stoke-on-Trent City Council	Utilising the Total Resource of Stoke-on-Trent - through city system integration	-	
Swindon Borough Council	Future Swindon	-	
Warrington Borough Council	Warrington Future Cities	-	
Northern Ireland	Belfast City Council	Belfast Cube	-
Scotland	Glasgow City Council	Glasgow City Management System	£24m (overall winner), relabelled as 'Future City Glasgow'
	Dundee City Council	Future City Dundee	-
Wales	Cardiff City Council	(Cardiff Future Cities Demonstration project)	-

## **Appendix 2: Key sources (official documents, websites, media reports) identified and analysed during ‘process tracing’ technique**

### **National FCD initiative**

- Future Cities Demonstrator: Competition for Large-scale Demonstrator Project Funding (TSB, 2012)
- Smart Cities: Background Paper (Department for Business, Innovation & Skills, 2013)
- Solutions for Cities: An Analysis of the Feasibility Studies from the Future Cities Demonstrator Programme (TSB/Arup, 2013)
- New initiative to support \$40 billion smart cities in the UK. Press release (Department for Business, Innovation & Skills, 9 October 2013)
- UK set to lead the way for smart cities. Press release (Department for Business, Innovation & Skills, 18 December 2013)
- Future Cities Demonstrator Competition: Feasibility Studies Interim Report (TSB, 2013)
- Learning from Future Cities Demonstrator (Innovate UK, 2015)
- Future Cities UK: Investing in Better Places to Live, Work and Play (Innovate UK, 2015)
- Evidence Check: Smart Cities. Government Statement (House of Commons Science & Technology Committee 2015-16)
- Future Cities Dialogue: A Project Investigating Urban System Integration in the UK (Forum for the Future/Innovate UK/Sciencewise/Ipsos MORI 2017)

### **Glasgow**

- Glasgow City Management System. FCD Feasibility Study (Glasgow City Council, 2012)
- Digital City: Infrastructure Investment in Traffcom and CCTV. Executive Committee Report by Councillor J. Coleman (Glasgow City Council, 2012)
- Minutes of Glasgow City Council 2012/2013 – Print 4 (Glasgow City Council 2012-13)
- Future City Glasgow. Website (Glasgow City Council; 2013—)
- Open Glasgow. Website (Glasgow City Council; 2013—)
- The Open Manifesto: Future City Principles (Future City Glasgow/Glasgow City Council, 2013)
- City Technology Platform: Technical Architecture Context (Future City Glasgow/Glasgow City Council, 2013)
- Glasgow aims to be the first ‘smart city’. Media report (Financial Times, 3/6/2014)
- Glasgow: The Future Cities Demonstrator. Presentation by G Walker (Land Art Generator, 2015)
- Labour Administration Budget Proposal 2016-18 (Glasgow City Council, 2015)
- Evolving Glasgow’s future city. Media report (Computer Weekly, July 2016)
- What are ‘Smart Cities’? Glasgow City Centre Strategy (Glasgow City Council, 2016)
- Building a Future City. Future City Glasgow evaluation report (mruk, 2017)
- Future City Glasgow, part 1-3. Media report (Scottish Business News Network, 17/12/2017-22/1/2018)

### **Bristol**

- Smart City Bristol. Report presented by C.Tuppen. (Bristol City Council, 2011)
- Connect Bristol. FCD Feasibility Study (Bristol City Council, 2012)
- Delivering the Smart City: Governing Cities in the Digital Age. Report (published by Arup/Liveable Cities/UCL/Smart City Expo World Congress, 2014)
- Mayor’s Forward Plan. Agenda of decisions to be made at forthcoming Council meetings. (Bristol City Council, Jan 2015)
- Bristol Is Open - The Programmable City. Cabinet Report. (Bristol City Council, Feb 2015).
- Connecting Bristol. Creative. Smart. Green. Connected Website (Connected Bristol, ongoing)
- Bristol is Open. Website (Bristol is Open, 2014—)
- REPLICATE (Renaissance of Places with Innovative Citizenship and Technology). Website
- State of the art operations centre opens in Bristol. Press release (Bristol City Council, 16/10/2017)

### **London**

- Linked London. FCD Feasibility Study (TSB, 2012)
- Smart London Board. Website (Greater London Authority, 2013—)
- Smart London. Website (Greater London Authority, 2013—)
- Smart London Plan (Greater London Authority/Smart London Board, 2013)
- Smart London Innovation Networks. Website (Greater London Authority/BRE/Institute for Sustainability, 2014—)
- Smart Park Queen Elizabeth Olympic Park. Website (Greater London Authority, 2014—)
- Director’s Decision DD1231; DD1883; DD1442; ADD345 (Speed Volunteering) (Greater London Authority, 2014 & 2015)
- Director’s Decision DD1160 & DD1346 (Agile Urban Logistics) (Greater London Authority, 2014 & 2015)
- Smart London Demonstrator Programme: New Innovative Demonstrator Projects (Greater London Authority, 2015)
- The Future of Smart (Greater London Authority/Smart London Board, 2016)
- Mayoral Decision MD1581 Smart London Demonstrator Programme (Greater London Authority, 2016)
- A Chief Digital Officer for All Londoners: Defining and Scoping the Role (Centre for London/London First, 2016)
- Data for London: A City Strategy for London (Greater London Authority, 2016)
- Smart City Opportunities for London (Greater London Authority/Arup, 2016)
- Mayor outlines ambition to make London world’s leading ‘smart city’. Press release (Greater London Authority, 12/6/2017)
- ‘Londoners to help the capital become the world’s leading smart city’. Press release (Greater London Authority, 23/1/2018)

### **Peterborough**

- Peterborough DNA. FCD Feasibility Study (2012)
- Peterborough: Delivering a Truly Smart City. Report (Peterborough City Council, 2014)
- Peterborough awarded smart city of the year 2015. Webpage (Opportunity Peterborough 2015)

- Statement of Accounts 2014/15 (Peterborough City Council 2015)
- Statement of Accounts 2015/16 (Peterborough City Council 2016)
- Statement of Accounts 2016/17 (Peterborough City Council 2017)
- Canadian city looks to Peterborough for tech innovators. Webpage (Opportunity Peterborough 2017)
- Taipei delegation comes to Peterborough. Webpage (Opportunity Peterborough 2017)
- Peterborough DNA: Future Cities Programme. Webpage (Opportunity Peterborough, accessed 2018)
- Programme: Shaping Smart City Leaders. Webpage (Future Peterborough, accessed 2018)
- Our Projects. Webpage (Future Peterborough, accessed 2018)

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