

Inclusive innovation in cities: From buzzword to policy

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Abstract

‘Inclusive innovation’ has become an increasingly important sub-national policy agenda. This paper reviews this agenda, critiques its current usage, and presents a new framework for how the concept can be applied. Efforts to shape the direction, improve participation in, and share the benefits of innovation should be an important part of place-based innovation policy. Yet inclusive innovation strategies face three related problems: neophilia, a tendency for technological fixes, and the lack of local powers. The paper concludes with a framework for how the concept could be used by policymakers to link innovation with shared prosperity.

Keywords: Inclusive innovation; Regional policy; Inclusive Growth; Regional innovation

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1. Introduction

Governments devote significant resources to innovation policy, on the basis that innovation is one of the most important determinants of long-term economic performance. Yet innovation is fundamentally a disruptive activity - it can create losers as well as winners, and the gains are often unevenly distributed. For example, disadvantaged groups are often under-represented in innovation related activities and so do not gain from higher wages in advanced sectors (Echeverri-Carroll et al., 2018). There is concern that corporate interests dominate innovation (Chataway et al., 2014), so innovation funding is focused on the affluent rather than the needy - Bill Gates has famously claimed that more money is spent researching baldness than Malaria (Chu, 2013). And the most innovative cities and regions often find themselves with polarised labour markets and lower real wages for many groups (Lee and Rodríguez-Pose, 2016; Lee and Clarke, 2019; Kemeny and Osman, 2019).

In this context, policymakers have increasingly focused on the idea of ‘inclusive innovation’. The term came into widespread use in the economic development literature (e.g. Altenburg et al., 2009; Chataway et al., 2014; Heeks et al., 2014), before becoming increasingly important in the ‘advanced’ economies of the OECD. At a national level, social goals are now prominent in innovation strategies - in a study of 10 innovation strategies from a diverse range of countries including Germany and South Africa, Stanley et al. (2018) found that all included environmental objectives, and seven included more general ‘social’ goals. There is increasing agreement on the need to integrate innovation strategies with wider inclusion and social policy goals (George et al., 2013; Zehavi and Breznitz, 2017; Uyarra et al., 2019).

Yet a related agenda has been largely unremarked: the idea of inclusive innovation has become increasingly important at a *sub-national* scale. For example, the US state of Georgia has launched a partnership for inclusive innovation, the Northern Irish city of Belfast has launched a commission for “Innovation and Inclusive Growth”, and Innovate North Carolina, a partnership body, has an “inclusive innovation Policy Toolkit”. Other cities have more formally integrated inclusive innovation as part of their economic development strategies, or even launched specific ones for inclusive innovation. These changes are likely driven by a global trend to devolution and a growing interest in the sub-national level for innovation strategies (see McCann and Ortega-Argilés, 2013), but also a widespread concern that the benefits of the innovation economy are being concentrated rather than spread (Feldman et al., 2020). However, while there are multiple studies on similar policy agendas, notably inclusive growth (e.g. Sissons et al., 2019; Lee, 2019; Hughes and Lupton, 2020; Evenhuis et al., 2021), the inclusive innovation policy agenda has been largely ignored.

This paper addresses this gap. It investigates two basic questions: (1) how is inclusive innovation being operationalised at a city-scale? (2) how can city policymakers use innovation policy in a way which ensures that the benefits reach disadvantaged groups? It addresses these questions through a three-stage strategy. First, I provide a review of the concept of inclusive innovation as used in the academic literature. Second, drawing on exploratory studies of three cases - Washington DC, Pittsburgh, and London (UK) – I present a critique of current policy. Finally, I draw on these two activities in an inductive approach to develop a new framework for inclusive innovation interventions at the city scale.

The paper finds that inclusive innovation at a sub-national level has multiple, inconsistent meanings (a classic ‘fuzzy concept’ like Inclusive Growth) but argues many of the policies which form part of these strategies - notably around participation in the innovation economy - are important and necessary. However, strategies have a tendency towards neophilia, a focus on the new and exciting, rather than the effective and boring; and equally, technological solutionism, the search for a technological fix for complex social problems. Moreover, there is a mismatch between the pure conceptualisations of inclusive innovation and the actual powers held by city governments. Rather than lapse into neophilia, the paper then presents a framework for thinking about how innovation policy at a city level can influence distributional outcomes, based on three stages of the process: at the *strategic* level about who sets the priorities for innovation; at the *participatory* level, about who is involved in the innovation workforce and; about finally about managing the *outcomes of innovation*. Most worthwhile inclusive innovation activities fall into these categories, but structuring them in this way provides city and regional governments with a way of organising policy and allows best practice to develop.

The paper makes several contributions to the literature. First, it focuses on the city and regional-scale. The conceptual literature on inclusive innovation has generally considered either the firm or nation state, such as George et al’s (2012) work on innovation for inclusive growth and the work of Heeks et al. (2014) on inclusive innovation in international development. The sub-national scale matters for inclusive innovation by allowing experimentation and reflecting context. Yet city governments vary in their interpretations of inclusive innovation and political will. Focusing on a sub-national scale helps to show how a concept developed for nations and firms works at a more local level. Second, the paper develops a critique of the application of inclusive innovation. It builds on arguments made by papers on Inclusive Growth (e.g. Lee, 2019; Green et al., 2019; Waite et al., 2020; Hughes et al., 2020), but extends these to a new, related concept. Finally, it adds a new framework for thinking about inclusive innovation, based on an evaluation of existing strategies. In this respect, the paper develops work in this area such as Zehavi and Breznitz’s (2017) conceptualisation of distribution

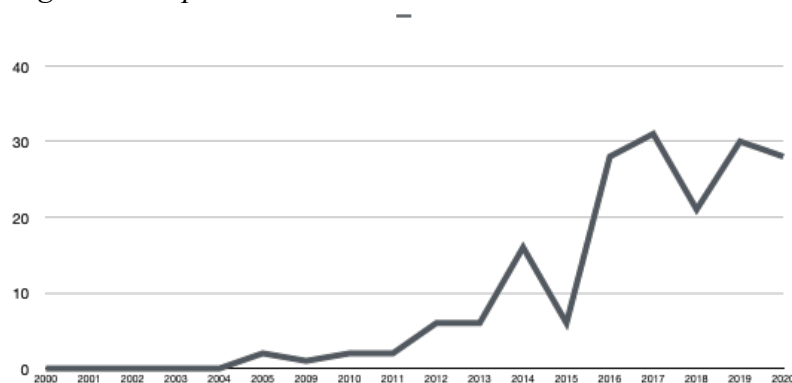
sensitive innovation policies. The aim is to provide a constructive, rather than destructive, critique of the term.

The paper is structured as follows. Section two considers the existing literature, focusing on the concept in the development literature, literature on inclusive innovation as a business opportunity, and literature on policy. Section three considers meanings of the term. Section four provides three examples of the term's use and, based on these, section five presents a new critique. Section six presents a new framework for the application of inclusive innovation at a city level. Section seven concludes with implications for academia and practice.

2. Inclusive innovation: The development of a concept

Innovation is generally seen as a force for economic development and progress. Yet there has always been an undercurrent of concern about its implications. This has often involved a focus on the role of technology in changing labour markets and the consequences in terms of wage distribution (e.g. Kurer and Gallego, 2019) or the changing geography of jobs (e.g. Martynovich and Lundquist, 2016). But the idea that innovation systems themselves could be recalibrated in a way which made them more inclusive has gained prominence in the academic literature (e.g. Breznitz, 2021). Reflecting this, the term 'inclusive innovation' has developed over the last decade. It has no shared definition, but can be, very generally, applied to attempts to make the innovation process more equitable in some form.

Figure 1. Scopus: Published articles with the term 'Inclusive innovation' since 2000



Source: Scopus. Accessed 17th March 2021.

The number of papers on inclusive innovation increased rapidly in the second half of the 2010s. Figure 1 shows the number of new documents published per year which include the phrase 'inclusive innovation' in the title or keywords. Except for a small bump in interest in the mid-2000s, the term was barely used until 2009 since when it has been on a steep, if erratic, trajectory. The concept, or

subtle variations on it, have been popular and impactful in the academic literature - for example George et al.'s (2012) theoretical review on “innovation for inclusive growth” has been highly cited.

Some studies use simple definitions: for example, George et al. (2012: 661) define it as “innovation that benefits the disenfranchised”; others are simple but precise - “Inclusive innovation projects are initiatives that directly serve the welfare of lower-income and excluded groups” (OECD,2015: 5), and precise but complex: “Inclusive innovation policies are directed towards ensuring that the benefits and the risks of innovation are more equally shared. These policies will actively consider whose needs are met by innovation and how excluded social groups could be better served, focus on initiatives that promote broad participation in innovation, and take a democratic and participatory approach to priority-setting and the governance of innovation” (Stanley et al., 2019: 2).

The bulk of this work forms three main types – that focused on innovation and development, the management literature, and the literature more broadly on how innovation policy in advanced economies can be made more inclusive. These three different strands of literature have different starting points, conceptualisations, and implications.

Inclusive innovation and development: Bottom up-innovation

The idea of inclusive innovation as a tool for economic development came about in the 2000s, in response to a widespread set of concerns about the inclusivity in the direction of innovation processes. As Chataway et al. (2014: 34) argue, there were problems with the nature of ‘innovation’ processes at the time, because its:

“... capital-intensive nature, its scale intensity, its dependence on high-quality networked infrastructure, its reliance on skilled labour and its product portfolio (producing products which meet the needs of the rich) all have the effect of disadvantaging the poor, both as consumers and producers. It also excludes large segments of the population in many countries from productive employment.”

Based on this, Chataway et al. (2014) suggest that inclusive innovation aligns several trends: growing concern related to differential growth paths, in particular the contrast between the relatively inclusive East Asian growth model and that in Latin America; the Appropriate Technology movement which focuses on small scale, locally appropriate technologies; interest in the potential of disadvantaged communities as markets and producers of innovation (in particular, the ‘base of the pyramid’ innovation movement – developed by Prahalad, 2005), and the notion that some innovations serve as public goods and should be provided in an inclusive way.

Inclusive innovation was seen as a catch-all term for several related concerns. For Foster and Heeks (2013a: 333) it is a “new form of innovation” where the “core focus is the structures and processes required to develop and deliver innovative technologies (goods and services) incorporating the needs and interests of the poor”. “Inclusive innovation is the means by which new goods and services are developed for and by marginal groups (the poor, women, the disabled, ethnic minorities, etc).” (Heeks, 2015). It served as a convenient umbrella for a series of other concepts – including base of the pyramid innovation and pro-poor innovation – which differed in subtle focus.

The conceptualisation of inclusive innovation in this literature draws on a dissatisfaction with the dominant model of innovation in large firms (Chataway et al., 2014). Instead, there are overlaps with the idea of “grassroots innovation” which starts from the premise that “people at the grassroots level already have the ideas, knowledge, tools and capabilities required to create their own innovative solutions to climate change and sustainable development” (Smith et al., 2016: XX). This conceptualisation is less focused on the state as an innovation actor, and more on local communities. For example, Fressoli (2014) present case studies on India and Brazil and argue that grassroots innovation has important lessons for inclusive innovation, in particular a tension between the ‘context-sensitive’ solutions from grassroots innovation and the desire for mainstream policymakers to scale up successful models, irrelevant of context.

The development of inclusive innovation in the development literature is most often, but not exclusively, associated with a bottom-up, participatory model of development. This literature has some important lessons for policymakers. Policy seems to play an important role in shaping innovation systems to make them inclusive, for example through regulation which allows it, but policy doing so does not always have inclusivity as a central aim (Foster and Heeks, 2013b). Researchers in this area have shown how hard it is to genuinely engage disadvantaged groups without appropriate social organisation and representative structures (Swaans et al., 2014).

Inclusive innovation as a business opportunity

Studies in management start from the view that inclusive innovation is a business opportunity.¹ Work in this vein tends to begin with the idea that while the markets of advanced economies are ‘saturated’, those at the base of the pyramid represent a ‘significant growth opportunity’ (Hart and Christensen, 2002: 50). Hart and Christensen’s (2002) idea of disruptive innovation implies innovations which are not, at least initially, as good or useful as widely used alternatives. But less developed economies provide an opportunity to gain market share with new products and processes – often serving a social

¹ There are some hints at this in the development literature, e.g. Foster and Heeks (2013a), but it is less forceful.

purpose at the same time. They use the example of Grameen telecom in Bangladesh which provided a new form of telecoms services in underprivileged rural areas.

This notion of ‘bottom of the pyramid innovation’ relates closely to the idea of ‘frugal innovation’ or the “innovative, low-cost and high-quality products and business models originating in developing countries and exportable to other developing countries or even the developed world” (George et al., 2012: 662), the most famous (and failed) of which was the Tata Nano – a small, affordable car marketed in India. Some of the literature here extends the analysis of inclusive innovation further, highlighting the need to remove structural barriers to participation in entrepreneurship and innovation and so allow other groups to benefit from innovation (George et al., 2012).

Inclusive innovation as a policy approach

A final set of studies focus on these issues of categorisation. Of these, the most developed conceptualisation is the idea of distribution-sensitive innovation policy (DSIP) from Zehavi and Breznitz (2017). They define DSIP as (1) R&D in ‘traditional’ rather than high-tech industries, (2) science and technology in the periphery, (3) science and technology for disadvantaged minorities, and (4) science and technology for the disabled. They also distinguish between DSIP which are producer-oriented, aiming to include them in the production of innovation, and consumer oriented, aiming to produce products which will be used by disadvantaged groups. Compared to inclusive innovation, DSIP is more concrete, focused, and clearer in terms of policy – but the term is, at least for now, less commonly used than the notion of inclusive innovation, perhaps because it is more concrete.

One of the most developed comes from the UK’s National Endowment of Science, Technology and the Arts (NESTA). They highlight three main ways in which inclusive innovation can be understood (Stanley et al., 2018) – (1) “Broadening participation in the innovation economy” for example through increasing BAME involvement in the high-tech sector; (2) “Ensuring the benefits of innovation are shared by all” - for example, by ensuring that biomedical innovation represents the interests of groups who are not normally prioritised, and; (3) “Involving the public in shaping innovation policy” through public involvement in funding decision.

A similar use of the term comes from the idea that innovation-intensive sectors of the economy. Lowe and Wolf-Powers (2018) highlight the problems of job creation in US biopharmaceuticals, a sector in which it has proven hard to balance the need for skilled workers with job creation for those without advanced STEM skills. For Lowe and Wolf-Powers, inclusive innovation is about job creation and they use the term to mean “balanced and interconnected growth between research and production

jobs” (pp. 829). In this usage, inclusive innovation is less about the actual practice of innovation and more about the institutional frameworks in which it happens. This paper and other, similar studies, map out how policymakers can create good jobs for workers by linking manufacturing employment with R&D work (see also Lowe et al., 2021). As Lowe argues, inclusive innovation in this sense can represent a form of institutional coordination which can “advance economic innovation and economic opportunity” (2021: 137). This reflects a theme in the inclusive innovation literature, in that it can be a win-win for workers and the wider economy.

4. Three examples of inclusive innovation in practice

How is inclusive innovation being conceptualised and operationalised at a city-scale? To illustrate this, I draw on three examples – chosen as exemplars rather than representative cases – to show the ways in which the concept is used in practice. The three cities, London (UK), Washington DC (USA), and Pittsburgh, (USA), each have prominent strategies using the term inclusive innovation.

Inclusive innovation in London

The first example is London, UK, where inclusive innovation has become part of the policy discourse at both strategic and delivery levels. London has something of a paradox: one of the highest GDP per capita of any UK city, but also higher poverty and greater inequality than any other large city (Centre for Cities, 2020). The city has two of the UK’s largest ‘golden triangle’ science-focused universities, UCL and Imperial College, and a thriving tech industry (Nathan et al., 2019). But many of the most dynamic clusters are near significant disadvantage.

Policymakers in London explicitly aim to use the capital’s economic success to address disadvantage. The centrist Mayor of London, Sadiq Khan, represents the UK’s major left-wing party, Labour. The mayor’s office runs economic development via a Local Enterprise Partnership (the London ‘LEAP’) which produces a London Industrial Strategy designed to shape the city’s economy. The mayor’s powers include strategic planning, transport, and economic development. But some aspects of these are also covered by the 32 London Boroughs and the City of London. The result is that the mayor often takes a strategic lead, but the boroughs can have their own, related initiatives.

The result has been that inclusive innovation has taken different meanings at strategic and local levels. The idea of inclusive innovation has been important and clear at the strategic level. One of London LEAP’s overarching aims is to develop:

“an approach that supports and encourages innovation to drive productivity growth, especially where it is directed at solving London’s social, environmental and economic challenges, and where it benefits Londoners, SMEs and parts of the city that have not typically shared in the benefits of innovation. This will also include investigating the potential to apply new generation technologies to improve productivity and job quality across the economy”

(GLA, 2019)

Inclusive innovation here is used to refer to the use of innovation to address challenges, and to ensure benefits are widespread.

But the term is used differently in different parts of the same city. Part of the site of the 2012 Olympics has been made into an ‘inclusive innovation district’ - with space provided for disabled tech entrepreneurs (New London Architecture, 2020). Here, the concept has a second meaning - ensuring the innovation process, or at least entrepreneurship, can include disadvantaged groups. A third meaning comes from local policy. The Borough of Camden has produced an inclusive innovation network, with it defined as: “Doing something differently for improved outcomes, with a focus on social justice, resident-centred design and working in the open with all our communities.”. The focus here is on public service or organisational innovation, rather than innovation in the form of new products. This is very different to the meanings used by the Mayor’s Office or as rationale for the Olympic Park. In short, London shows the problems of applying a concept like inclusive innovation in a single city.

Pittsburgh’s Inclusive Innovation Roadmap

A second example is Pittsburgh, a formerly industrial city of around 300,000 people in Pennsylvania. The Mayor of Pittsburgh has powers over multiple areas, including cooperative working, public services, cultural activities and economic development. The city has had a Democratic Mayor since the 1930s, including the latest incumbent, Bill Peduso. While London’s focus on inclusive innovation was still nascent, Pittsburgh provides the most concrete example of the use of inclusive innovation at a local level: it has branded itself an “inclusive innovation city” through an “inclusive innovation roadmap” which ran from 2015 - 2018. This defined inclusive innovation as providing “equitable access to products and services by leveraging new technologies, ideas, personnel and inventions to meet new challenges and higher standards” (City of Pittsburgh, 2015: 4). It focused on six areas:

- **Enhance City Operations** - Use technology, improve employee engagement, and support internal development.

- **Close the Digital Divide** - Provide pathways to internet access, computer access and digital learning opportunities for all.
- **Connect Citizens with City Government** - Pilot strategies to facilitate communication between citizens and city government.
- **Strengthen Local Business** - Support entrepreneurs, small business owners, and innovation in the city.
- **Foster Clean Technology** - Lead the City of Pittsburgh in awareness and adoption of clean technology solutions
- **Champion Open Data** - Provide open data and create tools to visualise important public information for citizens.

Nested in each of these are a set of ‘goals’ and then ‘actions’ which provide further detail on what the meaning of each is. For example, under “Champion Open Data” is three goals - “Establish the Regional Data Centre”; “Employ Data Driven Operations”, and; “Increase 311 Call Centre Capacity” and a series of actions which include “Install Neighbourhood Nodes” (sensors collecting real time data) and “Partner with Civic Programmers” such as Code for America.

It is hard to establish the precise definition of inclusive innovation used here because the strategy is so broad: “inclusive innovation provides equitable access to products and services by leveraging new technologies, ideas, personnel and inventions to meet new challenges and higher standards.” This is framed both as a social justice element (“Focusing on inclusion means providing opportunities in the high-tech, high-skill innovation economy.”) but also in the sense that inclusion will have practical benefits for economic outcomes (“Diversity of gender, race, and background strengthens the chance for success in a competitive environment by improving decision-making and understanding of diverse markets.”).

The Pittsburgh strategy shows the difficulties of the approach. Some parts of the strategy, such as efforts to include diversity in the high-tech sector, are vital. But the strategy places tech at the forefront of inclusion, raising questions about the extent to which this can happen.

The inclusive innovation fund, Washington DC

A third example of the use of inclusive innovation is Washington DC, a city characterised by high levels of inequality. The Mayor of the District of Columbia has more extensive powers than the London Mayor, including law enforcement and public schools but also economic strategy. The Democratic Mayor from 2015, Muriel Bowser, set up an Innovation and Technology Inclusion Council with the stated aim of bringing together people from across the private and public sector to

focus on inclusion in the tech sector. The city also developed a specific strategy for inclusive innovation in 2016 - the Pathways to Inclusion Strategy which set out to diversify the tech economy:

“While many cities around the world are thriving in tech, Washington, DC is one of the first major jurisdictions to study inclusive innovation in depth, with three goals in mind: First, we will expand the capacity of DC residents to engage in the tech economy by creating 5,000 new tech jobs for underrepresented workers. Second, we will grow our tech economy by creating 500 new tech businesses founded by underrepresented entrepreneurs. Third, building on our city’s diversity, we will establish the most inclusive culture among tech ecosystems on the East Coast.”

(Mayor of Washington DC, 2016: 4)

Underpinning this was a set of initiatives such as an inclusive innovation Incubator, a business innovator with the specific aim of giving disadvantaged groups access to tech-entrepreneurship.

The strategy takes a Silicon Valley-style tech model of innovation and makes it inclusive. For example, one initiative is the DC Inclusive Innovation Fund which will invest in early-stage businesses “led by underrepresented entrepreneurs, including people of color, women, and LGBTQ people and individuals with disabilities.” Aping a classic VC model, it invests in “pre-seed, seed and pre-series A stage companies with at least 51% ownership by underrepresented entrepreneurs (i.e. those who identify as African American, Latino, Native American, women, LGBTQ, or disabled). The fund will target technology, technology-enabled and non-technology companies with potential to scale. The Marathon Foundation will also support prospective companies and entrepreneurs seeking investment with entrepreneurial training and education. The District will provide seed funding of \$1.5 million to help the fund raise private capital to support DC entrepreneurs.” This policy is justified as a solution to a ‘market failure’ as under-represented groups find it harder to raise finance for early-stage firms. It merges a desire for technology-based businesses - the fund focuses on “scalable tech or tech-enabled, DC-based businesses led by underrepresented entrepreneurs” but does so through a Silicon Valley style Venture Capital-esque model.

What does the DC case tell us? This is an agenda which is focused on tech and entrepreneurship, inspired by a Silicon Valley model. The specific policies are all ethically important, but relatively narrowly focused. And there are wider concerns about the ability of these initiatives to effectively address the multiple barriers faced by entrepreneurs from disadvantaged backgrounds or neighbourhoods (Blackburn and Ram, 2006; Lee and Drever, 2014).

5. Problematizing inclusive innovation

As with similar concepts, such as inclusive growth, there are several ways to think about inclusive innovation (Lee, 2019). The first is as a policy agenda. Policy moves in waves, as individuals find a tractable concept around which they can build consensus (Lowe and Feldman, 2018). Inclusive innovation can be understood as a broad thrust of policy undertaken by different actors, potentially in different ways, but with a shared aim of linking inclusion and innovation. A second way of thinking about inclusive innovation is as a specific buzzword or phrase. It is similar here to the idea of clusters, a term which entered the policy lexicon in the mid-1990s. Originally the idea of a cluster was relatively tightly defined, but term rapidly lost meaning, and became a buzzword to reflect a general idea without precise definition (Martin and Sunley, 2003). A third way of thinking about inclusive innovation is as a general concept which is subject to broadly shared definition and can be used to develop policy.

Strengths of the agenda

The inclusive innovation policy agenda makes some important arguments. It suggests that innovation policy can (1) be an important tool for inclusion, (2) that there is a need to recognise the distributional impact of innovation policy, but also (3) that by increasing inclusion policymakers can increase rates of innovation. This latter point is made strongly in many policy documents. For example, the Pittsburgh Roadmap (2016: 4) argues that “Diversity of gender, race, and background strengthens the chance for success in a competitive environment by improving decision-making and understanding of diverse markets” . In this respect, inclusive innovation represents another front in the long-running set of attempts by policymakers to reconcile efficiency with equity or competitiveness with cohesion (Sapir, 2004).

Many policies which are labelled as inclusive innovation are important and overdue. While there may be practical difficulties in the design of policies, those aimed at including disadvantaged groups in the R&D or tech workforce are morally important, regardless of their impact on innovation. Moreover, sub-national approaches can allow for the improved targeting of policy and experimentation. One critique of this agenda is that local strategies provide a placebo and only national policy matters. But the challenge is to align both national and local strategies, without allowing one to obscure the need for the other.

There are practical benefits to the agenda as well. This is particularly important in the context of strained city budgets – inclusive innovation suggests a way of using innovation funding in a way which might achieve social policy goals (Zehavi and Breznitz, 2017). Well-meaning urban policymakers often lack powers over inclusion but have a strong desire to achieve inclusive growth

(Lee, 2019). Inclusive innovation provides political cover to do so: few people can oppose innovation or inclusion.

Semantics: Buzzwords and Fuzzy Concepts.

However, while the merits of inclusive innovation are clear, there are some problems with the concept's practical application: its fuzziness, a tendency to solutionism and neophilia, and the problem of applicability at an urban level.

While the academic literature uses relatively defined notions of inclusive innovation, the term is used by policymakers in multiple ways. In a classic paper on the relationships between academic concepts and policy, Markusen (1999) argued that certain policy concepts had become malleable and nebulous, situations where: "researchers may believe they are addressing the same phenomena but may actually be targeting quite different ones". Academics were often, according to Markusen, moving from clear and concrete conceptualisations to abstract theorising and, in doing so, limiting the extent to which academic work influenced policy. Similar concepts, such as inclusive growth, have been labelled 'fuzzy' in the Markusen sense (Lee, 2019).

Inclusive innovation is a classic 'fuzzy concept'. Both 'inclusive' and 'innovation' are prone to multiple-interpretations. The classic Oslo manual definition (OECD, 2005) defines innovation as a "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organization or external relations." Most definitions also involve the successful implementation, in a particular firm, or commercialisation of an innovation, in that it must be applied or introduced to the market.

But policymakers focused on inclusive innovation interpret 'innovation' in multiple ways. Some use a conception of innovation as about STEM, R&D, or the high-tech sector, a conceptualisation dominant in Washington DC, London's Olympic Park, or the Bristol and Bath Creative Partnership. Innovation here is about sectors, and inclusion about under-represented groups. A second model of innovation is as entrepreneurship, sometimes in the tech sector but often more generally. Examples here include the Scottish Government, Dublin BIC, Flanders, DreamStart Facility (Brussels), or the inclusive innovation workshops in Gdansk. A third strand is that which was dominant in the London Borough of Camden – where innovation is used to refer to public service delivery. And the fourth conceptualisation is simply innovation as productivity. This is dominant in the Mayor of London's strategy. Each of these definitions is valid in some way, but they are very distinct in terms of policy. And none reflects the classic use of innovation in development studies to refer to the production of a particular type of good. An affordable car, the Tata Nano, is sometimes used as an example of an

inclusive innovation in the development literature (George et al., 2012). But because cities rarely have the powers to produce new products, the definitions of innovation used by cities is inevitably different.

In a seminal study on semantics in economic development, Cornwall and Brock (2005) consider the use of buzzwords in economic development policy. Focusing on three concepts which were particularly important at the time - participation, empowerment, and poverty reduction - they consider how concepts lose their meaning or, rather, their meanings are changed to become useful as they are updated and change their meanings as policymakers use them. Focusing on participation, empowerment, and poverty reduction, they argue that these are ripe for such reappropriating as they are optimistic, hard to oppose, but lack a clear, precise meaning. While the use of these buzzwords may pacify critics of development agencies, in doing so they may simply lose their meaning.

Inclusive innovation can be understood both as a buzzword - something fashionable which can be dropped into policy - but also as a fuzzy concept, in that there is no shared meaning behind the concept. As table 1 shows, the concept can be defined in many different ways and interpreted to mean a wide variety of policies. It joins other optimistic, well-meaning concepts such as Inclusive Growth (see Lee, 2019) which appeal to faddish urban policymakers (Turok, 2009). Clearly, policy processes are complex and evolutionary rather than set in abstract models (Flanagan et al., 2011), but even given this the range of policies labelled inclusive innovation seems very large.

The counterargument to this view is that it is precisely the conceptual fuzziness which makes the concept so useful. A lack of clear definition makes the concept malleable to different contexts; the concept can be applied regardless of political context, and both 'inclusion' and 'innovation' are exciting, positive terms making it is hard to argue against either (nobody can argue against 'inclusion').

But the fuzziness of the concept is also problematic. Clarity of definition allows some form of learning, with policymakers able to precisely define and draw out what works. It means that political efforts are clear and concrete, and so makes it possible for clear-headed evaluation. Otherwise, concepts such as inclusive innovation can become buzzwords which are applied to concepts with little direct impact. Fundamentally, unless there is a shared definition of a particular policy discourse, it becomes hard to learn, replicate, and use the concept. It also makes it hard to separate out which parts of policy are 'inclusive innovation' and which should be a more general part of public policy in cities. For example, the use of sensors which tell public officials when street rubbish bins are full is highlighted as an important in the Pittsburgh Roadmap for inclusive innovation. These are potentially

a useful tool for public policy. But are they inclusive innovation? They could clearly be seen as an innovation but it is hard to see how they are particularly inclusive.

Technological Solutionism and Neophilia

Two further, related critiques can be levelled at the notion of inclusive innovation. In his book on people's perceptions of technology, Morozov (2013) discusses the problems of "technological solutionism" – the idea that policy makers place a blind faith in the idea that technology can solve problems. Similarly, Scott-Smith (2016) argues for a form of "humanitarian neophilia" which "merges *neo* (new) and *philos* (love) to label an obsessive love of novelty." This neophilia, he argues, results in "an ideology that combines New Left and New Right with techno-utopian fervour." In doing so, he argues that there is a harmful disconnect between humanitarian agencies, who rely on new technologies, and the recipients, who would be better-off using older, trusted techniques of humanitarian intervention.

These themes of solutionism and neophilia are clear in the policy literature on inclusive innovation. Of course, urban policymakers have historically been criticised for boosterism in the past (e.g. Turok, 2009). But there certainly a strong case that there is technological solutionism inherent in the inclusive innovation agenda. It is hard to separate from the usual boosterist discussion of the effects of urban policy. But it is often apparently overstated in importance. Inequality and under-representation are the result of complex, interlinked phenomena, not simply exclusion from the tech economy. A strategy which addresses one part of this - inclusion in the tech economy - is perhaps treating the symptom of these problems rather than the causes. This is not to say they are worthless, but rather that they need to be considered as part of a much wider argument.

Solutionism which focuses on the provision of tech is also troubling. There are plenty of good examples where provision of new tech for disadvantaged groups have failed (e.g. 3D printers in Brazil [Woodson et al. 2019]). Yet the techno-optimism in some of these strategies does little to consider these wider contexts and problems. But the second part of Scott-Smith's argument - that there is a disconnect between recipients and groups - is less clear. Much of the II agenda is intended to address this point exactly, by bringing different groups into the participation in innovation at the strategic or operational level.

A second problem here is how much of the inclusive innovation is actually new and, more to the point, whether the label 'inclusive innovation' actually changes anything? Some strategies seem to be genuinely new, particularly those aimed at inclusion in the tech economy. Other parts of the policy

agenda simply seem to be using the term as a convenient label for policy initiatives which would have happened anyway.

Local government powers

Perhaps the most obvious critique is pragmatic. Strategies we have identified seem to start with a basic premise: how can innovation be made inclusive? But they are not really answering that question, but instead are focused on a subtly different one: how can the existing powers of a sub-national government unit influence the innovation economy? This second question is much harder to address, of course, because local areas rarely if ever have the powers to fully shape their economies. The Pittsburgh Roadmap (2016) is a great example here. It starts with claim that it seeks to “bridge the digital divide and provide opportunities for Pittsburghers to participate in the new economy” (3) which is, of course, a worthy goal. But part of the route to achieve that is to improve city web services (p. 11), branding of the city as “an inclusive innovation city”, and upgrading to smart bins. These may all be worthwhile activities, but the problem here is that the powers the city has do not match up the concept. In short, the concept of inclusive innovation needs to be matched onto the existing powers and responsibilities of city governments. Inclusive innovation may represent part of the solution, but will only ever address some parts of it. The problems faced by disadvantaged workers in weak or strong tech economies are often similar - low skills, expensive housing, or precarious work, to name a few. While worthwhile in many ways, these strategies can do little to address these wider structural problems which cause inequality.

Based on the strategies we have identified – and a reading of the academic literature – I identify ten basic ‘types’ of policy labelled as inclusive innovation, set out in table 1. These policies can be categorised into three broad groups – those which shape the direction of innovation in some sense, for example by including disadvantaged groups in setting priorities for innovation; those addressing inclusion in the innovation process, such as those focusing on ensuring diversity in STEM occupations; and downstream innovation policies which aim to use new technologies for social aims.

6. Inclusive innovation in cities: a new framework

How can city policymakers use innovation policy to benefit disadvantaged groups? As argued above, both the existing literature on inclusive innovation and the three cases show that it is used in multiple ways according to the pre-conceived ideas and mandates of policymakers. Yet these different meanings can be seen as helpful in the sense that they reveal the different ways in which innovation

policy can be used to benefit the disadvantaged. Each relates to a form of innovation policy, which can then be used in an inductive way to derive a tractable framework for policy at a local level.

One of the few structured frameworks for inclusive innovation comes from the UK's innovation endowment, NESTA (Stanley et al., 2018). This sets out three types of about (1) the overall objectives of innovation, (2) the direction of innovation – in particular in whose need it serves; (3) participation – such as regions, sectors, or groups involved; and governance, about priorities of the innovation process. Yet this framework works better for national policymakers rather than those focused on sub-national areas. At a city level, the consequences of technological change are particularly obvious. Moreover, there are grey areas between the 'objectives' and 'direction' of innovation in the NESTA conceptualisation. Instead, based on the academic literature and three exploratory case studies, I propose a simple framework which sets out a three-stage way of thinking about inclusive innovation at a city level:

Strategy → Participation → Outcomes

Each of these represents a stage in the innovation process, but also a distinct area for policy. Table 1 lists the meanings which were apparent in either the review of academic literature or the exploratory analysis of three city strategies, and places them within this simple framework. I have excluded those which are clearly related to solutionism, are far beyond the powers of city or regional governments or are unfocused uses of buzzwords.

Insert table 1 around here

Inclusive innovation at the strategic stage

Inclusive innovation policy begins with the strategic decisions about which places, sectors, products or processes are the focus. Inclusive innovation is meant in four main senses here. First, it is often about decision-making in innovation agencies, such as the Washington DC inclusive tech leadership council which aims to provide strategic advice in the city. There was concern that decisions were made by an unrepresentative group of the population and, as a result, innovation spending was focused on areas where the benefits would be limited.

Two other common meanings of inclusive innovation are the sectoral and geographical focus of innovation policy. One way of making innovation inclusive is to focus R&D funding on non-traditional sectors, with the aim of increasing productivity and raising wages in those sectors (NESTA, 2019). This often reflects more recent thinking which argues that policy need to invest in

the foundational economy sectors which are crucial to many economies but find it hard to achieve scale economies (Hansen, 2021). Alongside this, the term is often used to consider innovation investments in areas which have not developed self-sustaining innovation systems (Widuto, 2019), often because they lack the financial resources to do so (Forth and Jones, 2020). This might mean policies to address self-reinforcing Matthew's effects of innovation funding where funding tends to flow to those who have successful in obtaining such funding previously. Inclusive innovation here clearly overlaps with other long-standing forms of regional innovation policy. A final use of the term is for attempts to achieve innovation in public services. Efforts by policymakers in London to improve public services through innovation fall into this category.

Inclusive participation in the innovation process

The next set of meanings relate to participation in innovation. There is a clear, important rationale for these policies. There are significant ethnic disparities in STEM educational attainment or the R&D workforces of most developed economies (e.g. OECD, 2017; Joice and Tetlow, 2019), and this is one of the core problems with the innovation economy. Workers in innovative companies earn higher wages, benefiting from innovation (for example, Aghion et al., 2019 show the wage premium of working in an innovative company is higher for those with less formal education). This agenda has likely been boosted by resurgent efforts to address pervasive ethnic disparities.

There are three main ways cities can enable greater participation in the innovation process: encouraging participation in entrepreneurship, participation in the innovation workforce, and through education focused on STEM or other required skills. There is a clear justification for city policymaker to act here: sub-national government has clearer ideas of the local patterns of inclusion and exclusion, as shown in the contrast between Washington DC's attempts to integrate unrepresented groups into the city's innovation economy or efforts to spread the benefits of London's Queen Elizabeth Park innovation district to residents of Newham. Yet there is also a need for caution. Policies to increase entrepreneurship amongst disadvantaged groups have a chequered history (Blackburn and Ram, 2006), sometimes even causing harm to those they are designed to help (Storey, 1995). The focus of policies in this area, such as those in Washington DC, tend to be focused on scalable products rather than generic businesses in non-tradeable sectors. But entrepreneurship is a risky activity and policies tread a fine line between encouraging and over-encouraging entrepreneurship.

Inclusive innovation outcomes

The final area where cities have an important role is in ensuring the outcomes of innovation are inclusive. The 'classic' definition of an inclusive innovation, where the actual innovation is designed to appeal to disadvantaged groups, applies here as it refers to the outcomes. Other forms of inclusive

innovation policy in this area include those which are about responses to innovation, for example by retraining workers displaced by new technologies, or simply spreading innovation with the assumption that the benefits will somehow reach disadvantaged groups. This latter type of category is particularly questionable as evidence shows that while there is a significant economic benefit of being in a city with a strong high-tech economy, high-tech growth does not reduce poverty rates (Lee and Rodríguez-Pose, 2016). Complementary policies are needed to translate innovation into economic outcomes for the disadvantaged worker. Inclusive innovation is also about dissemination – in particular, policies which help firms or workers in disadvantaged areas make better use of technology. This latter type of inclusive innovation policy, where done well, has the potential to have a particularly positive impact on growth, as the diffusion of innovation is vital for growth (Bessen, 2015).

7. Conclusions

Inclusive innovation has become an increasingly important policy agenda. In various forms, it has spread from the literature on international development and management, to national government, and has now become an important part of many city government's plans. The aim of this paper has been to summarise this agenda, consider the various ways in which inclusive innovation is being conceptualised, and to develop a tractable framework for how local policymakers can think about the concept. The inclusive innovation agenda is an important recognition of the distributional consequences of innovation policy. Yet, to shape innovation processes for the better it needs to overcome some endemic problems of policy in this area. Illustrative examples show three traps for inclusive innovation policy when applied to cities: fuzziness, technological solutionism and neophilia, and lack of local powers.

What is new or distinct about this agenda? Some aspects of the agenda, such as when used to justify spreading R&D funding geographically, are simply a new label for old agendas. Other concepts, such as Distribution Sensitive Innovation Policy or Responsible Research and Innovation, overlap but are better developed (Zehavi and Breznitz, 2017; Fitjar et al., 2019). Yet others, in particular efforts to increase diversity in the STEM workforce, are overdue, important, and timely. As cities take responsibility for innovation policy, it is important for them to thinking through how inclusive strategic choices are, who is participating in the production of innovation, and how the consequences of innovation develop. This simple framework includes most of the common definitions of inclusive innovation and helps avoid pitfalls of solutionism or naively assuming that the benefits of innovation will, inevitably, trickle-down.

But inclusive innovation can do little to address entrenched poverty alone. Here, the notion of the ‘policy mix’ is useful. As Flanagan et al. (2011) note, the interaction between different innovation policy instruments, and their evolution over time, is crucial to the success of innovation policy. But the ‘mix’ of instruments which matter for inclusion will span innovation policy but also social policies, the law, policies governance, and so on. Inclusive innovation policy has more potential if embedded in a wider strategy of addressing disadvantage. Perhaps the most important part of the inclusive innovation agenda is that it reframes innovation to put attention on the purpose and rationale behind innovation. Innovation is not a ‘good’ nor a ‘bad’ thing, but a means to a wider end (Uyarra et al., 2011). Inclusive innovation strategies can be helpful in that they force policymakers to reflect on these questions of beneficiaries and participants, rather than simply considering innovation for its own sake.

References

Aghion, P., Bergeaud, A., Blundell, R., & Griffith, R. (2019). CEP Discussion Paper No 1665 December 2019 The Innovation Premium to Soft Skills in Low-Skilled Occupations.

Altenburg, T., Lundvall, B., Joseph, K., Chaminade, C., & Vang, J. (2009). Building inclusive innovation systems in developing countries: challenges for IS research. *Handbook of innovation systems and developing countries: Building domestic capabilities in a global setting*, 33-56.

Bessen, J. (2015). *Learning by doing: The Real Connection between Innovation, Wages, and Wealth* Yale University Press.

Blackburn, R., & Ram, M. (2006). Fix or fixation? The contributions and limitations of entrepreneurship and small firms to combating social exclusion. *Entrepreneurship and Regional Development*, 18(1), 73-89.

Braune, A. (2020) inclusive innovation in Urban Policy: Post-political urban governance or a way towards equality? MSc Thesis Dissertation, London School of Economics and Political Science.

Breznitz, D. (2021). *Innovation in real places: Strategies for prosperity in an unforgiving world*. Oxford University Press, USA.

Chataway, J., Hanlin, R., & Kaplinsky, R. (2014). Inclusive innovation: an architecture for policy development. *Innovation and Development*, 4(1), 33-54.

Centre for Cities (2020) *Cities Outlook 2020*. London, Centre for Cities.

Chu, B. (2013). Bill Gates: Why do we care more about baldness than malaria? *The Independent*, London. Saturday 16 March 2013

City of Pittsburgh. (2015). Pittsburgh Roadmap for inclusive innovation. <http://pittsburghpa.gov/innovation-performance/innovationroadmap/documents/Pittsburgh-Roadmap-for-Inclusive-Innovation.pdf>

Cornwall, A., & Brock, K. (2005). What do buzzwords do for development policy? A critical look at 'participation', 'empowerment' and 'poverty reduction'. *Third World Quarterly*, 26(7), 1043-1060.

Echeverri-Carroll, E. L., Oden, M. D., Gibson, D. V., & Johnston, E. A. (2018). Unintended consequences on gender diversity of high-tech growth and labor market polarization. *Research Policy*, 47(1), 209-217.

Evenhuis, E., Lee, N., Martin, R., & Tyler, P. (2021). Rethinking the political economy of place: challenges of productivity and inclusion. *Cambridge Journal of Regions, Economy and Society*.

Feldman, M., Guy, F., & Iammarino, S. (2021). Regional income disparities, monopoly and finance. *Cambridge Journal of Regions, Economy and Society*, 14(1), 25-49.

Fitjar, R. D., Benneworth, P., & Asheim, B. T. (2019). Towards regional responsible research and innovation? Integrating RRI and RIS3 in European innovation policy. *Science and Public Policy*, 46(5), 772-783.

Flanagan, K., Uyarra, E., & Laranja, M. (2011). Reconceptualising the 'policy mix' for innovation. *Research policy*, 40(5), 702-713.

Foster, C., & Heeks, R. (2013a). Conceptualising inclusive innovation: Modifying systems of innovation frameworks to understand diffusion of new technology to low-income consumers. *The European Journal of Development Research*, 25(3), 333-355.

Forth, T. & Jones, R. (2020). The Missing £4 Billion: Making R&D work for the whole UK. London, NESTA. Available from:
https://media.nesta.org.uk/documents/The_Missing_4_Billion_Making_RD_work_for_the_whole_UK_v4.pdf

Foster, C., & Heeks, R. (2013b). Analyzing policy for inclusive innovation: the mobile sector and base-of-the-pyramid markets in Kenya. *Innovation and Development*, 3(1), 103-119.

Fressoli, M., Arond, E., Abrol, D., Smith, A., Ely, A., & Dias, R. (2014). When grassroots innovation movements encounter mainstream institutions: implications for models of inclusive innovation. *Innovation and Development*, 4(2), 277-292.

George, G., McGahan, A.M. & Prabhu, J. (2012). Innovation for inclusive growth: Towards a theoretical framework and a research agenda. *Journal of Management Studies*, 49(4), pp.661-683.

Hansen, T. (2021). The foundational economy and regional development. *Regional Studies*, 1-10.

Heeks, R., Foster, C., & Nugroho, Y. (2014). New models of inclusive innovation for development. *Innovation and Development* 4(2), 175-185.

Hall, J., Matos, S., Sheehan, L. & Silvestre, B. (2012). Entrepreneurship and innovation at the base of the pyramid: a recipe for inclusive growth or social exclusion?. *Journal of Management Studies*, 49(4), pp.785-812.

Hart, S. L., & Christensen, C. M. (2002). The great leap: Driving innovation from the base of the pyramid. *MIT Sloan management review*, 44(1), 51.

Heeks, R., Foster, C. & Nugroho, Y. (2014). New models of inclusive innovation for development. *Innovation and Development*, 4(2), 175-185.

Hughes, C., & Lupton, R. (2020). Understanding inclusive growth at local level: changing patterns and types of neighbourhood disadvantage in three English city-regions. *Cambridge Journal of Regions, Economy and Society*.

Joice, W. and Tetlow, A. 2020. Ethnicity STEM data for students and academic staff in higher education 2007/08 to 2018/19. Available from: <https://royalsociety.org/-/media/policy/Publications/2021/trends-ethnic-minorities-stem/Ethnicity-STEM-data-for-students-and-academic-staff-in-higher-education.pdf>

Kemeny, T., & Osman, T. (2018). The wider impacts of high-technology employment: Evidence from US cities. *Research Policy*, 47(9), 1729-1740.

Lee, N. (2019). Inclusive Growth in cities: a sympathetic critique. *Regional Studies*, 53(3), 424-434.

Lee, N., & Clarke, S. (2019). Do low-skilled workers gain from high-tech employment growth? High-technology multipliers, employment and wages in Britain. *Research Policy*, 48(9), 103803.

Lee, N., & Drever, E. (2014). Do SMEs in deprived areas find it harder to access finance? Evidence from the UK Small Business Survey. *Entrepreneurship & Regional Development*, 26(3-4), 337-356.

Lee, N., & Rodríguez-Pose, A. (2016). Is there trickle-down from tech? Poverty, employment, and the high-technology multiplier in US cities. *Annals of the American Association of Geographers*, 106(5), 1114-1134.

Lowe, N. J., & Wolf-Powers, L. (2018). Who works in a working region? Inclusive innovation in the new manufacturing economy. *Regional Studies*, 52(6), 828-839.

Lowe, N., & Feldman, M. P. (2018). Breaking the waves: Innovating at the intersections of economic development. *Economic Development Quarterly*, 32(3), 183-194.

Markusen, A. (1999). Fuzzy concepts, scanty evidence, policy distance: the case for rigour and policy relevance in critical regional studies. *Regional Studies* 33, 869-884.

Martynovich, M., & Lundquist, K. J. (2016). Technological change and geographical reallocation of labour: On the role of leading industries. *Regional Studies*, 50(10), 1633-1647

Martin, R., & Sunley, P. (2003). Deconstructing clusters: chaotic concept or policy panacea?. *Journal of economic geography*, 3(1), 5-35.

McCann, P., & Ortega-Argilés, R. (2013). Modern regional innovation policy. *Cambridge Journal of Regions, Economy and Society*, 6(2), 187-216.

Morozov, E. (2013). *To save everything, click here: The folly of technological solutionism*. New York, Public Affairs.

Nathan, M., Vandore, E., & Voss, G. (2019). Spatial imaginaries and tech cities: place-branding East London's digital economy. *Journal of Economic Geography*, 19(2), 409-432.

OECD. (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data* (No. 4). Org. for Economic Cooperation & Development, Paris.

OECD. (2015). *Innovation Policies for Inclusive Growth*. Org. for Economic Cooperation & Development, Paris.

OECD. (2017). *The Pursuit of Gender Inequality: An Uphill Battle*. Org. for Economic Cooperation & Development, Paris.

Pittsburgh (2015) *Pittsburgh Roadmap for Inclusive Innovation*. Available at: <https://pittsburghpa.gov/innovation-performance/innovationroadmap/documents/Pittsburgh-Roadmap-for-Inclusive-Innovation.pdf>

- Planes-Satorra, S. & Paunov, C., 2017. Inclusive innovation policies: Lessons from international case studies. *OECD Science, Technology and Industry Working Papers*, 2017(2), p.1.
- Prahalad, C. K. (2005). *The Fortune at the Bottom of the Pyramid*. Wharton School Pub, Pennsylvania.
- Sapir, A. (2006). Globalization and the reform of European social models. *JCMS: Journal of Common Market Studies*, 44(2), 369-390.
- Scott-Smith, T. (2016). Humanitarian neophilia: the ‘innovation turn’ and its implications. *Third World Quarterly*, 37(12), 2229-2251.
- Sissons, P., Green, A. E., & Broughton, K. (2019). Inclusive growth in English cities: mainstreamed or sidelined?. *Regional studies*, 53(3), 435-446.
- Stanley, I., Glennie, A. & Gabriel, M. (2018). How inclusive is innovation policy?. London, NESTA.
- Swaans, K., Boogaard, B., Bendapudi, R., Taye, H., Hendrickx, S., & Klerkx, L. (2014). Operationalizing inclusive innovation: lessons from innovation platforms in livestock value chains in India and Mozambique. *Innovation and Development*, 4(2), 239-257.
- Turok, I. (2009). The distinctive city: pitfalls in the pursuit of differential advantage. *Environment and planning A*, 41(1), 13-30.
- Uyarra, E., Ribeiro, B., & Dale-Clough, L. (2019). Exploring the normative turn in regional innovation policy: responsibility and the quest for public value. *European Planning Studies*, 27(12), 2359-2375.
- Waite, D., Whyte, B., & Muirie, J. (2020). From an agreeable policy label to a practical policy framework: inclusive growth in city-regions. *European Planning Studies*, 28(9), 1812-1835.
- Woodson, T., Alcantara, J. T., & do Nascimento, M. S. (2019). Is 3D printing an inclusive innovation?: An examination of 3D printing in Brazil. *Technovation*, 80, 54-62.
- Zehavi, A. & Breznitz, D. (2017). Distribution sensitive innovation policies: Conceptualization and empirical examples. *Research Policy*, 46(1), pp.327-336.

Table 1. Variations of inclusive innovation policy

Type	Definition	Example policy
Strategy		
<i>1. Inclusive decision making for innovation</i>	Who chooses priorities for innovation policy	Washington DC's inclusive tech leadership council
<i>2. Innovation in inclusive sectors</i>	Shifting innovation funding to foundational / mundane sectors	NESTA's proposal for R&D spending in foundational industries
<i>3. Geographically diversifying innovation</i>	Policies spreading innovation to low-innovation regions	Much classic 'regional development' policy
<i>4. Innovation in inclusion</i>	New forms of public services, social enterprise which benefit disadvantaged groups	London Borough of Camden's inclusive innovation network
Participation		
<i>5. Participation in entrepreneurship</i>	Efforts to ensure disadvantaged groups can set up firms	London's incubator for disabled entrepreneurs
<i>6. Participation in the innovation workforce</i>	Ensuring holders of STEM jobs are representative, e.g. Gender / STEM	Washington DC's targets to increase underrepresented groups employment in tech sector
<i>7. STEM focused education</i>	Increasing STEM skills amongst underrepresented groups	London's efforts to integrate local schools into the QEP innovation district
Outcomes		
<i>8. Ensuring inclusive responses to innovation</i>	Policies considering the impact of technological change / innovation	Retraining of displaced workers
<i>9. Inclusive innovations</i>	Focus on a particular innovation which serves disadvantaged groups	A non-urban example is the Tata Nano
<i>10. Innovation for Inclusive Growth</i>	Focus on innovation with the assumption that benefits will trickle down	Much of the London strategy
<i>11. Dissemination of innovation</i>	Policies aiming to ensure disadvantaged groups have access to new technology	Policies to address digital divide in Washington DC

