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Inclusive Innovation, Development and Policy: Four Key Themes

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Abstract There is widespread recognition of political economy factors that underline 'inclusive innovation'. Key among these include the trio of states, markets and society; the conditions that lead to technology transfer, adoption and finally diffusion in a new context; the corresponding creation of indigenous capacity with participation from local actors and stakeholders; and socially inclusive outcomes that can thrive from complementarities of technology and social innovation. Building on these ideas from the IDS 50th Anniversary Conference in July 2016, this article links them with the Heeks Ladder of Inclusive Innovation to discuss the prospects for further inclusive innovation and development.

Keywords: inclusive innovation, development, policy.

1 Introduction

There is widespread recognition of political economy factors that underline innovation and its role in development. Key among these are interactions that span the trio of states, markets and society governed by a set of rules and institutional frameworks (Altenburg 2009); conditions that lead technology to be transferred, adopted and finally diffused in a new context; the corresponding creation of indigenous capacity with participation from local actors; and socially inclusive outcomes that can thrive from complementarities of technology and social innovation. The Institute of Development Studies (IDS) 50th Anniversary Conference debated these key themes in furthering the agenda of inclusive innovation and development.

As early as the 1970s, IDS and the Science Policy Research Unit (SPRU) at the University of Sussex collaborated to produce the so-called *Sussex Manifesto* (Singer *et al.* 1970). This brought innovation into the centre of the development discussion, stressing the role played by technology and research. In 2010, IDS and SPRU collaborated again to produce a follow-up *Innovation, Sustainability, Development: A New Manifesto* (STEPS Centre 2010). This laid emphasis on organising innovation as being networked, distributed and inclusive, where various groups of people and stakeholders are included, especially the poor and marginalised.

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In this entire period, innovation has been hypothesised as an amalgamation of various processes that emerge from the interactions among various actors that are involved in those processes.[1] A parallel can be drawn with the concept of global value chains where various innovations come together to bring a product or service from conception to the final consumers (Kaplinsky and Morris 2001). However, weak institutions and less formal definitions of interactions among the actors often present challenges for innovation to be inclusive at various nodes of the chain. As a result, excluded groups (for instance, smallholder farmers or the marginalised without access to health services) may fall outside the domain of creation and impact from conventional innovations. 'Inclusive innovation' emerged in response to these challenges that emerged for excluded sections of society.

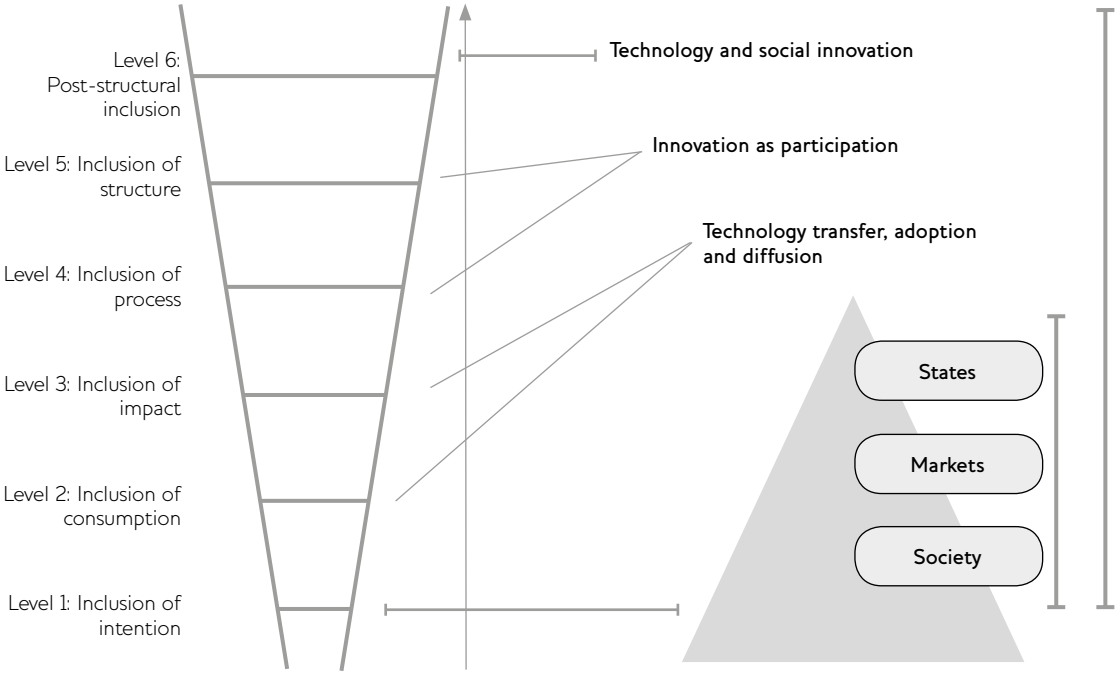
There have been various developments of the concept of inclusive innovations since 2010. In this article, I draw on the work of Foster and Heeks (2013), where inclusive innovation is defined such that marginalised groups are incorporated within the structures and processes that underline an innovation activity. The key questions stressed in their work are 'who is included in innovation?', and 'where to include them?'. Both acquire importance from the perspective of the political economy of innovation that creates inclusive outcomes and is also inclusive in terms of the innovation process itself, the latter alluding to the social shaping of technologies (Smith 2014). This approach helps support the frame of analysis for the ideas discussed in this article.

Heeks, Foster and Nugroho (2014) developed their work on innovation further as the 'Ladder of Inclusive Innovation', outlining six levels to help ascertain if an innovation was inclusive: 'intention' (intends to address the needs of the excluded); 'consumption' (adopted and used by the excluded); 'impact' (positive impact on the livelihoods of the excluded); 'process' (if the excluded are involved in the development of the innovation); 'structure' (created within a structure that is itself inclusive); and 'post-structure' (created within a frame of inclusive knowledge). Each level involves gradual broadening of the extent of inclusion of the excluded groups and presents a useful framework to evaluate the extent of inclusion encompassed in a specific innovation.

Saha (2016) outlined six aspects of inclusive innovation and development that were discussed and debated at the IDS 50th Anniversary Conference. Attempting to draw key themes that can feed into the Heeks Ladder of Inclusive Innovation, here I discuss four, as depicted in Figure 1. First, interactions among the trio of states, markets and society with links to the bottom of the ladder; second, technology adoption, diffusion and upgrading in parallel with the middle of the ladder; third, innovation as participation towards the top; and fourth, the complementarities of technology and social innovation, right at the top of the ladder.

In discussing the four themes, I draw on recent developments in the field of innovation that were also vibrant in the debate at the conference.

Figure 1 Four key themes from the IDS 50th Anniversary Conference to feed into the Heeks Ladder of Inclusive Innovation



Source Representation by author adapting Heeks *et al.* (2014) and ideas from the IDS 50th Anniversary Conference in Saha (2016).

These include the emphasis on political economy of interactions leading to innovations, the global systems of innovation (Martin 2015), thinking of innovation in terms of new or incremental improvements, not only in products, but in terms of processes/markets/organisation, and finally the social framing of innovations (Smith 2014).

The remainder of the article is organised as follows. Section 2 outlines key literature and analysis around the trio of states, markets and society. In Section 3, I draw from key debates on technology transfer, adoption and diffusion. Section 4 discusses the idea of innovation as participation. Section 5 hypothesises the complementarities of technology and social innovation. Section 6 concludes and highlights topics for further research in these areas.

2 The trio of states, markets and society

The literature on innovation has identified the range of actors that are involved, varying across sectors and countries. These actors are drawn from state-owned institutions involved in developing new products or supporting them (state), the private sector that also undertake similar initiatives (markets); and research and education systems (Chataway, Hanlin and Kaplinsky 2014) as well as not-for-profit organisations (society).

To work towards the goal of inclusive inclusion, the trio of states, markets and society play not only a primary role but comprise the set of actors that are in fact an imperative to the process of innovation for any country. In the Heeks *et al.* (2014) ladder, this trio can be situated in parallel with the first level of 'intention', with essential support to ensure outcomes for the following levels, and especially to push the existing frontiers leading to the fourth level of inclusion in 'process'.

The role of the state in innovation has received immense emphasis in Mazzucato (2011), where the author draws attention to the role of the state in not only fixing markets but also in shaping and in fact creating them. She outlines 'mission-oriented' finance as strategic public sector investment to trigger economic activity and innovation, and to create opportunities for markets and economic growth. Such finance begins on the premise of problem-specific challenges that need to be solved, and requires coordination across different sectors and the state. While the example of the iPhone is the most popular example in Mazzucato's work, the ideas are also reverberant in several other less documented instances.

One such example is the evolving progress in anti-retroviral drugs and therapy in Mozambique (Pfeiffer *et al.* 2010) where donor funding has been coordinated by the government following national health objectives on HIV/AIDS with positive spillovers to overall primary health care for the country. Even though the finance came from international agencies, the commitment to tackle the disease on the part of the Mozambique government has led to significant reductions in disease burdens. The most recent success has been a Brazilian collaboration for a factory that is producing anti-retroviral drugs (Russo and de Oliveira 2016).

Innovation policy is often attributed to being about supporting discovery processes that necessarily involve significant trial and error (Rodrik 2004). However, countries may find themselves trapped in situations where poverty can limit the scope of investment capacity to further innovation on the one hand, while the absence of efficient institutions may inhibit the process further (Altenburg 2009) on the other. In this scenario, while the state must play a greater role to regulate markets and prevent market failure, it is also important that there are institutions that can carefully evaluate potential winners and lessons to learn in the playing field (Mazzucato 2011).

Therefore, arguments from existing literature point towards the role of the state in furthering inclusive innovation to especially ascertain 'intention' in the Heeks *et al.* (2014) ladder. Such 'intention' can be discovered by means of exploratory public sector organisations that can identify opportunities where investments in new innovations can address the needs of excluded groups. On the lines of Mazzucato (2011), while strategic public finance led by the state can be key here, there is an essential room for careful monitoring of such institutions to overcome gaps between intentions that are outlined and those that are actualised. Further, the role played by markets and public–private partnerships

cannot be discounted. Private actors often support large-scale investments that may include donor aid in cooperation with national governments to facilitate the correct channelling of resources. Again, there is the need to strengthen checks and balances to prevent this from being skewed in the favour of powerful corporations.

What will be key in future policies aimed at assessing the 'intention' to achieve inclusive innovation will be the synergies of partnerships between states and markets. The role of non-governmental organisations (NGOs) is also of importance as agents of policy implementation for increased inclusion that act independently of states or markets. Therefore, for the trio of actors, each stands to make an essential contribution in 'intention' going forward with inclusive innovation, and to overcome gaps between stated intentions and actualising them.

3 Technology transfer, adoption and diffusion

Technology transfer, adoption and diffusion play a crucial role following up from the creation of a new technology or innovation. How technology transfer in developing countries can lead to adoption and actual diffusion in terms of building local capabilities is of importance for 'consumption' and 'impact' in the Heeks *et al.* (2014) ladder.

To enable low-income producers and consumers to adopt the innovation, emerging productive activities that replace less efficient ones should be accessible for the most marginalised actors. Altenburg (2009) outlines that labour market rigidities and skills development may be the key binding constraints for integrating low-income workers in competitive industries.

Once the new technology or innovation is created and transferred to new settings, innovation still occurs at every stage from production or adoption of the new good or service to distribution or diffusion of the good or service along the value chain. Also, further innovations may occur on feedback from surrounding social systems that lead to the creation of further innovations (Foster and Heeks 2013).

Taking the case of agriculture as an example, transfer of technologies can solve specific problems at the farm level, such as adoption of new seed varieties, irrigation systems, etc. for smallholder farmers. However, for innovations to be inclusive, significant changes are essential in supporting social systems such as input services, marketing systems, intermediaries and others. These are necessary to support consumption such that small-scale farmers can adapt the innovations to local conditions and create positive impacts on their livelihoods.

While new technology can improve productivity and thereby create improved livelihoods for the excluded, investments in local capability are essential for the impact to be sustainable. Thereby investments in national technology need to focus on the objective of diffusion such that adopted innovations can enable the creation of design and capabilities for transforming existing knowledge into new configurations by local

stakeholders (Bell 2007). Therefore, while technology transfer and adoption is criticised for increasing reliance on foreign sources of innovation, investment in local capability for diffusion of knowledge is necessary.

Technology transfer may, however, stop at adoption without creating any diffusion. One example is the cut-flower industry in Ethiopia, where the introduction of seed varieties and other technologies such as glass greenhouses from abroad created jobs for the local population and sparked a significant rise in cut-flower exports of the country (Perry 2011). However, this has not been followed by the building of significant local research capacities as most technology continues to be foreign sourced. Although the cut-flower value chain has witnessed some local innovations in other linked sectors of transport in the use of chilling trucks and warehouses, local diffusion for innovations has only been limited.

For technology transfer to lead to diffusion, innovation policies should focus on reaching out to wider sections of the population of excluded groups. Various types of technology transfer and their corresponding pathways to diffusion lead to varied outcomes on inclusion. For example, the adoption of foreign seed varieties in agriculture can lead to further investments in research and creation of local production capability that then creates jobs for the local population, but the creation of inclusion will depend on the wellbeing of workers, impact for excluded groups, gender effects, etc.

In the context of global value chains, this can be assessed for instance by the extent to which the small and medium enterprises and the small-scale farmers in least developed countries (LDCs) can actually upgrade and link into the existing global value chains being led by China and India.[2] This can be key to unlocking the potential of technology transfer, leading to adoption and finally diffusion, especially for poorer countries that face constraints in forwarding the goals of inclusive innovation.

An important policy lesson is that adoption of foreign technology needs to be supported by national policies and investments in research capabilities to catalyse local diffusion and create wider impact for 'consumption' and 'impact'. Altenburg (2009) has emphasised the importance of sustainable policies that can support the adoption and diffusion of new technology to speed up the process of learning and shifting resources to more productive uses. This includes developing markets for subsidies, improved governance of financial markets, competition policy, simplification of business procedures, property rights reforms, labour market reforms, etc. Thereby, it also outlines the importance of the design of institutions to enable technological learning in a socially inclusive way.

4 Innovation as participation

Innovation as a process based on 'participation' can occur within a structure that is inclusive by being a combination of new or external technology that adds value to existing or local structures and includes the excluded groups in the creation of innovation. This furthers the

goal of inclusive innovation and calls for policy conducive to creating structures that support the goals of inclusivity. The emphasis on building local capacity can be traced to ideas of 'putting the last first' (Chambers 1983) and of 'development as freedom' (Sen 1999).

In the Heeks *et al.* (2014) ladder, the levels of 'process' and 'structure' essentially point to the creation of new technology or innovation with participation from local actors. The role of local entrepreneurs and local research organisations that are better aware of local needs creates actors that can contribute to this participation, and creates knowledge to cater to local and national needs supported by local stakeholder involvement. The role of local actors is exemplified in the engagement of communities and especially community health workers in health services provision in resource-poor countries such as the case of anti-retroviral treatment (ART) in Mozambique (Hog 2014).

Heeks *et al.* (2013) stress the hybridity of inclusive innovations expressed as the combination of external and local knowledge, seen to take place within a single individual, within a group, within an organisation, via collaboration or via intermediaries. This hybridity is important from the perspective of 'innovation as participation' that implies broadening the very foundation of innovation, to begin from neglected issues faced by excluded groups, but often built in collaboration with external support.

Development policy to build on the view of innovation driven by local needs with support from external agencies is not without its critiques. Arora and Romijn (2009) discuss the nature of participatory practice that determines local knowledge situated within structures of asymmetric power distribution. This includes development experts and communities on the one hand, and the global/national corporate capital on the other. Therefore, for the active role of communities in ART provision in Mozambique situated within donor–government–local community structures, the balance between the exercise of power by international bodies and the potential disempowerment of public services and local actors needs to be kept in check for ensuring effective participation.

Therefore, innovation seen as participation not only involves reaching out to the marginalised but also working with them such that technology is seen in its capability of being empowering. This suggests innovation as a distributed activity where innovations and organisational structures are built on local knowledge, but also to ensure excluded groups are included in the process of innovation with balanced power equations. Innovation can then occur within a structure that is inclusive by being a combination of new or external technology that adds value to existing or local structures.

5 Technology and social innovation

The collaboration of technological innovation and contribution from social innovation puts light on framing innovations in a social context. 'Social innovation' can be defined as innovation that leads to broad-

based outcomes for society (Gaventa and Mathie 2015). Bringing together the idea of innovation that creates smart growth, with a social context that leads to inclusive growth and improved social welfare can be set within the argument that there is in fact nothing natural or inevitable about technological trajectories, and that these are shaped by social forces and actor interests (Smith 2014).

A linked concern about design–reality gaps from Heeks (2002) emphasises that innovation designs mismatched to the realities of low-income consumers can fail in adoption. The need for innovation to be matched with the realities of low-income consumers is an important component of the final top level of 'post-structure' in the Heeks *et al.* (2014) ladder. Creation of new ideas in an inclusive knowledge frame where excluded groups are involved in creation of the knowledge that can build on the unmet needs of the marginalised.

Smith (2014) outlines the role of community-based networks, where access to technical advice and prototyping services to develop socially useful products enabled tapping into the scientific and innovation knowledge of communities and social networks. Examples of community-led provision of services, especially in the health sector in several African countries such as Kenya, Ethiopia and Mozambique, have created wider access to health provision for people outside the coverage of primary health care. While there are often limitations to achieving socially inclusive frames of knowledge creation, the role of development policy can support initiatives to overcome these and create a combination of smart and inclusive growth.

The role of cooperatives comprising smallholder farmers producing livestock and small-scale milk vendors is another example that stands out as a social frame where people-led initiatives have created success in dairy production in Kenya, leading to improved milk yield and nutrition outcomes (Staal, Pratt and Jabbar 2008). Cooperative groups have filled in gaps especially in providing crucial input services to small-scale farmers in production and transport services along the milk value chain. These organisation and marketing innovations have emerged from the unmet needs of marginalised farmers and actors, where local research organisations further supported the development of innovations. While small-scale farmers and the role of women have been significant, there are still unmet challenges from the affordability of input services that lie outside of the scope of public services and cooperatives.

Therefore, innovation created on the premise of inclusive networks of knowledge can contribute to activity that consciously shapes technology for social benefit, creating inclusive outcomes in innovation. Development policy, by facilitating support systems for these networks, has a valuable role to play in furthering inclusion.

6 Conclusion

There is now widespread recognition of the role of inclusive innovation in development and the importance of political economy factors. This article

has analysed four key aspects of inclusive innovation and shows how they help elaborate and modify the Heeks Ladder of Inclusive Innovation.

The particular interactions among the trio of states, markets and society is strategic for creating new technology and innovations for any country. State-led support, markets and donors and not-for-profit organisations are important contributors to its creation. What will be key in future policies and research aimed at inclusive innovation is not only to assess 'intention', but also to find the means to fill the gaps between merely stated intentions and actualised intentions, possibly using the synergies of partnerships between states and markets, as well as non-governmental agencies.

Technology adoption, diffusion and upgrading are discussed as fundamental steps following the creation of new technology or innovation. The adoption and actual diffusion in building local capabilities is emphasised for 'consumption' and 'impact'. Sustainable policies by way of institutions and social systems are identified as important to facilitate adoption and diffusion. The institutions and support to enable the creation of local capability will be key in policy design.

'Innovation as participation' contributes to 'process' and 'structure' for inclusive innovation. Local entrepreneurs and research organisations can create knowledge that caters to local and national needs by means of local stakeholder involvement. Therefore, this can ensure that innovation is inclusive also in terms of the process of creating the innovation within a structure that is itself inclusive. Further research in this area needs a special emphasis on the system of checks and balances for the exercise of power by external agents and the potential disempowerment of domestic actors to ensure effective participation.

Finally, the complementarities of technology and social innovation is an overarching theme for inclusive innovation. The social frame for innovation with emphasis on the 'post-structure' of inclusive knowledge stands out in the conscious shaping of technology for social benefit, towards creating inclusive outcomes in innovation.

The four themes above are identified as essentials for furthering the agenda of inclusive innovation, development and policy. These could provide valuable foci for future research to disaggregate finer nuances, and to relate these to policies and practices to further inclusive innovations.

Notes

1 Innovation has been outlined as emerging from a broad network of dynamically linked actors within a particular institutional context (Lundvall 2011).
2 See for instance Banga and Saha (forthcoming), where LDCs are examined as potential links into existing global value chains for India.

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