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How inclusive can innovation and development be in the twenty-first century?

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Innovation is crucial for development. Addressing twenty-first century developmental challenges requires innovative processes and products, which help in reducing and/or eliminating the gap between rich and poor in the society. Such innovations can meet basic needs of low- and middle-income groups in developing countries, providing them with capabilities to function. The aim of this paper is to answer the question of how inclusive (of people and places) innovation and development can be in the twenty-first century. The paper therefore reviews new models of innovation for development, including ‘frugal’ and ‘grassroots’ or ‘below the radar’ innovation models. The argument put forward is that their inclusiveness depends not only on their diffusion to the poor but also on their generation according to principles of participation and equity derived from contemporary theories of global justice. These are conditions with direct impact on meeting the poor’s basic needs and increasing their capabilities to function.

Keywords: inclusive innovation; development; global justice; equity; participation; basic needs

1. Introduction

Innovation and development are interrelated concepts. The former refers to developing new ways of doing things by mixing up ideas and/or combining technologies; the latter refers to changing people’s conditions by removing various types of socio-economic, political and natural constraints, which leave them unfree to enjoy equal social relations and pursue the kinds of life they value. This interrelation between innovation and development has traditionally been approached in the context of the formal sector, i.e. the sector of socio-economic activities, which is formally regulated and included in gross domestic product (GDP). However, since the dawn of the new millennium, we have been witnessing a growing body of social and economic research that, on the one hand, demonstrates technological innovation in the formal sector fails to address the needs of the poor (Arocena and Sutz 2003; Arocena and Sutz 2012; Chataway, Hanlin, and Kaplinsky 2013; Cozzens 2007; Cozzens et al. 2005; Prahalad 2005; Smith, Fressoli, and Hernán 2013; Srinivas and Sutz 2008) and, on the other, identifies emerging models for creation of pro-poor products and services associated with the informal sector. These include ‘frugal’ innovations, i.e. simplified versions of existing technological products, and ‘grassroots or below the radar’ innovations (BRI), i.e. low- and middle-income group-generated innovations drawing on traditional knowledge and available technologies. A recent Organization for Economic Co-operation and Development (OECD) report brands them as ‘inclusive innovations’

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arguing that they can contribute substantially to improving the welfare of the worst-off in developing countries (OECD 2012). In this sense, inclusive innovations begin to be understood not only as emerging factors of international development which succeed where the so-called Sussex Manifesto (SM) (Singer et al. 1970) and the Appropriate Technology Movement (ATM) (Schumacher 1973) failed, but also as essential means of global justice which are able to meet twenty-first century challenges, such as deepening poverty and increasing health needs, in the global south.

The aim of this paper is to address the following question: how inclusive (of people and places) can innovation and development be given twenty-first century globalizing capitalism? In order to achieve its aim, the paper reviews emerging models of frugal and grassroots or BRI innovations from the point of view of global justice. It argues that the inclusiveness of such models in fact depends not only on their diffusion to the poor but also on their generation according to political principles of equity and participation. Taking such principles seriously has a direct impact on meeting the basic needs of the poor and increasing their capabilities to function.

The paper is divided into five sections. Section 2 critically analyses the concept of inclusiveness and its importance for evaluating innovation. In doing so, it draws on contemporary theories of global justice. Section 3 discusses in detail emerging models of innovation for development. Section 4 evaluates such models in terms of inclusiveness. Section 5 concludes that no innovation can be inclusive unless global justice principles of participation and equity are applied in the process of new product generation and diffusion.

2. The concept of inclusiveness and its importance for evaluating innovation

Before we address the question of inclusive innovation and development within twenty-first century capitalism, we should clarify the concept of inclusiveness. This concept has been traditionally defined as the opposite of social exclusion. However, although the latter has received tremendous attention since its introduction in the 1970s (De Haan 1997; Figueiredo and De Haan 1998; Gore and Figueiredo 1997; Jordan 1996; Rodgers, Gore, and Figueiredo 1995; Silver 1995) the former has been less popular with social scientists and political philosophers. One reason for this may be that the concept of inclusiveness is related to social equity, equality of opportunity and democratic participation. Thus, it presupposes a multi-dimensional theory of justice that incorporates all these principles. Such a theory is difficult to develop, given the preoccupation of political philosophy with fair distribution of income and wealth. Inclusiveness describes processes of equalization of resources, welfare or capabilities, which prevent people from becoming marginalized and deprived. Although, as Hickey and du Toit (2007) point out, the concept is not coterminous with poverty reduction, many poor people, especially in the developing world, are not included in (or are excluded from) the benefits offered by globalization. As Sen (2000, 2) explains,

Globalisation is both a threat (especially to traditional ways of earning and living) and an enormous opportunity (especially in providing new ways of being prosperous and affluent). The ability of people to use the positive prospects depends on their not being excluded from the effective opportunities that globalization offers (such as new patterns of exchange, new goods to produce, new skills to develop, new techniques of production to use, and so on).

Evidence suggests that countries of Sub-Saharan Africa (SSA) are less integrated than developed areas of East Asia, Europe and North America, with increasing global inequality (Martell 2007). Although SSA witnessed high rates of growth during the 2000s (almost 50% higher than the global average), the number of people living at or below US$1.25 per day increased by 59%.
Similarly, India despite its recent high growth rates, witnessed a further 42 million people living below the absolute poverty line (Chataway, Hanlin and Kaplinsky 2013).

This persistent exclusion of the poor across the globe has prompted contemporary cosmopolitan theorists, such as Pogge (2002), Beitz (2005), Caney (2005), Singer (2008), Nussbaum (2008) and Sen (2009), to argue convincingly that rich countries have obligations towards the poor. These obligations are founded upon the idea of global justice. Indeed, global justice obligations are more demanding than humanitarian aid. As Beitz (1975) argues, they require sacrifices on the part of the better-off and global institutional reforms. Cosmopolitans insist that principles of distributive justice with global scope should govern all processes of resource, welfare or capability allocation, including innovation and development. Inclusiveness can only come about through the application of such principles. Thus, for instance, in the field of health innovation, cosmopolitans such as Pogge (2002) propose expansion of the Rawlsian ‘difference principle’ and the ‘equal right to basic liberty’ in order to justify the political development of global institutions that can promote inclusive innovation and development. According to these principles ‘… social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone’s advantage and (b) attached to positions and offices open to all’ (Rawls 1972, 60). Although, as is well known (Papaioannou 2011; Papaioannou, Yanacopulos, and Aksoy 2009), in his The Laws of Peoples, Rawls (1999) strongly rejects the monism between the global and the domestic, Pogge (2005) insists that a global theory of justice can only be Rawlsian in its principles. Thus he proposes a global social structure guided by the difference principle and the equal right to basic liberty that can include institutions such as a Health Impact Fund (HIF), which would provide innovators with stable and financial incentives to address the needs of the poor.

It might be said that, in essence, Pogge advances an institutional solution to the problem of exclusive innovation and development. Especially in the case of the HIF, the purpose is to address two aspects of exclusiveness: the lack of equal access to essential medicines and the failure to develop innovative drugs for the poor. Both aspects manifest due to the lack of market demand in low-income countries (Prahalad 2005). For Pogge, the solution is an alternative intellectual property rights (IPR) system (what he calls the Patent 2 option) that operates in parallel to the current IPR system (what he calls the Patent 1 option) and that requires innovators to make public all information about their innovation. This makes them eligible for reward from an international HIF in proportion to the positive impact of their innovation on increasing health (i.e. inclusiveness) and decreasing poverty (i.e. exclusiveness) (Hollis and Pogge 2008).

As has been argued elsewhere (Papaioannou 2013) although Hollis and Pogge’s institutional proposal for a HIF has been designed to promote inclusive innovation and proactive or creative equality (Arocena and Sutz 2003), it fails to do so in a number of respects. First, a HIF is based on the profit incentives argument that suggests innovation-generated inequality can be justified so long as it improves the lives of the worse-off. This argument accepts that inclusiveness can be unequal. In the case of Pogge’s proposal, the more positive the impact of innovations on increasing health and decreasing poverty, the more reward for HIF innovators. Second, such a proposal is limited to health innovation. In this sense, it is narrow and cannot necessarily be extended to other areas of innovation for the poor. Third, a HIF is based on voluntariness. If big pharmaceutical companies fail to invoke the Patent 2 option, then this option would be like ‘… unfinished monuments in the desert: testimonies to failed ambition’ (Buchanan, Cole, and Keohane 2011, 20).

Cosmopolitans such as Buchanan, Cole and Keohane (2011) accept the importance of global justice for inclusive innovation but reject the extension of Rawls’s principles to development of new global institutions such as a HIF. For them, positive rights of distributive justice can be legally enforced by international law (Papaioannou 2013). Non-Rawlsian cosmopolitans such as Buchanan, Cole, and Keohane (2011) propose to promote inclusive innovation and
development through a Global Institute for Justice in Innovation (GIJI). Given that their concern is impediment to diffusion of innovation in general and not just health, these cosmopolitan thinkers argue that a GIJI would be an institution designed to construct and implement a set of policies governing the just and inclusive diffusion of innovations. This institution, in a similar way to the World Trade Organisation, would

… encourage the creation of useful innovations, for example through prizes and grants for justice-promoting innovations and through offering extended patent life for innovations that have a positive impact on justice. But its major efforts would be directed toward the wider and faster diffusion of innovations in order to ameliorate extreme deprivations and reduce their negative impact on basic political and economic inequalities … (Buchanan, Cole, and Keohane 2011, 9–10)

One important asset of GIJI would be the possibility to authorize compulsory licensing of slowly diffusing innovations. Another asset would be the possibility of compensation through GIJI and not through royalties from the sales of licensed innovations.

It might be argued that, although both assets of GIJI are important, they do not go far enough to replace the current IPR system with new incentives for inclusive innovation and development. Neither compulsory licensing nor compensation through GIJI can lead to innovatively inclusive societies where all people and communities are given equal opportunities to participate in the generation of innovation and to access novel products and services. Science, technology and innovation can play crucial roles in improving the lives of poor people, making them better-off compared to their previous situation (Arocena and Sutz 2012; Juma et al. 2001; UNDP 2001). However, as has been argued elsewhere (Papaioannou 2013), even if we assumed that the assets of GIJI could promote inclusiveness of people and places in science, technology and innovation, they would face serious problems, such as the lack of political support from powerful industrialized countries, conflict of material interests and power relations in the global structure (Callinicos 2002; Rosenberg 1994).

2.1. Sen and capabilities

One powerful critique of both Rawlsian and non-Rawlsian proposals is Sen. Even though also a cosmopolitan thinker, in The Idea of Justice, Sen argues that

Justice is ultimately connected with the way people’s lives go, and not merely with the nature of the institutions surrounding them. In contrast, many of the principal theories of justice concentrate overwhelmingly on how to establish just institutions and give some derivative and subsidiary role to behavioural features. (Sen 2009, x–xi; italics added)

The inability of just institutions to deliver equity and participation lies in their top-down and formal character that fails to influence how people transform their ‘primary goods’, e.g. rights, liberties, income, wealth, etc. into specific functionings.

As has been pointed out elsewhere (Papaioannou 2013), Sen is more interested in just development than just innovation. This is because specific types of innovation constitute means of development and not ends in themselves. For Sen, the issue seems to be whether such innovations can substantially connect to basic capabilities, e.g. life, health, imagination, etc. and thereby to specific functionings, which people have reason to value. If so, then they can reduce injustice in development. The latter is a process of freedom that according to Sen (1999, 3) ‘… requires the removal of major sources of unfreedom: poverty as well as tyranny, poor economic opportunities as well as systematic social deprivation, neglect of basic facilities as well as intolerance or overactivity of repressive states’. For Sen, freedom is both the end and the means of development.
People ought to be capable of choosing the kind of life they (have reason to) value. Therefore, people have good reason to value not being excluded from innovations which can increase their capabilities. In a paper on ‘Social Exclusion: Concept, Application and Scrutiny’ Sen (2000, 4) argues that ‘… capability deprivation can take the form of social exclusion. This relates to the importance of taking part in the life of community… ’. From this argument it follows that the extent to which innovations are inclusive depends on their impact on people’s capabilities for performing certain social functionings. In Sen’s theory, capabilities as such are

… sets of vectors of functionings … A functioning may be any kind of action performed, or state achieved, by an individual, and may a priori cover anything that pertains to the full description of the individual’s life. Therefore, such a description may be done by a list or “vector” (or “n-tuple”) of functionings. (Fleurbaey 2006, 300)

Sen does not allow for functionings that are not based on capabilities. Rather, he thinks that even if people are capable of certain functionings, it is up to them to choose whether they want to achieve them or not. Sen appears to give capabilities ‘lexical priority’ over functionings. The reason why he prioritizes capabilities over functionings is clear: by focusing only on achievements, one would miss the freedom dimension of human life. Thus, great achievements in terms of ‘frugal’ and ‘grassroots or BRI’ are in fact not so great if they take place in a totalitarian state of affairs that allows little or no space for freedom. Such innovative achievements are of limited or of no value.

Certainly, Sen’s capability approach has received criticism (Clark 2006) as regards the problem of disagreement about the valuation of capabilities (Beitz 1986), the high informational requirements of the system (Alkire 2002) and the paternalistic way of determining capabilities for low-income developing countries. However, despite criticism, this approach has been endorsed by global policy organizations in the area of innovation and development, including the United Nations, the World Bank and even the International Monetary Fund (Pieterse 2010). The strength of the capabilities approach is first of all that it is flexible, allowing theorists and policy-makers to apply it in different ways (Alkire 2002). Second, the capability approach neither puts forward a fixed index of capabilities nor presupposes one social context within which to assess individual advantage. Third, this approach does not claim to be a complete theory of justice or inclusive development, recognizing the need for incorporation of other principles, including growth and efficiency (Clark 2006). Fourth, and more importantly, the capability approach does not impose an institutional solution to the problem of inclusive innovation and development. In this sense, it allows for new models of innovation to be evaluated in terms of their contribution towards preventing capability deprivation.

Although the capability approach is a strong normative candidate for evaluating new models of innovation in terms of inclusiveness, it seems to have a crucial weakness: it assumes liberal cosmopolitan politics and structures for its implementation. Recent evidence from political sociology suggests that there is no basis for such politics (Martell 2011). Cosmopolitanism as a theory of global justice politically fails to promote inclusiveness on the ground. Our critique here endorses recent political arguments according to which ‘… cosmopolitan ethics may be requiring non-cosmopolitan politics’ (Martell 2011, 621). These arguments do not necessarily raise doubts about cosmopolitanism as a normative approach to global justice and inclusiveness but do criticize it as a political approach to equity and participation. Cosmopolitanism in general and Sen’s theory of capabilities in particular tend to view politics in terms of common global consciousness of problems such as the growing gap between rich and poor. Therefore, they pursue equity (of capabilities) and (democratic) participation as global solutions negotiated and agreed at
cosmopolitan forums and top-down institutions, e.g. the World Trade Organisation. However, as Martell (2008, 131) points out

… such global consciousness is unlikely. One reason for doubt is the lack of empirical evidence for it. Powerful nations sometime opt out of shared consciousness or action or make the problem worse. They put economic or national interests before … common consciousness.

Indeed, it might be argued that equity and participation are egalitarian principles which cannot be pursued and achieved through consensus at top-down political institutions. Equity and participation aim at ending socially imposed oppression and at guiding the formation of a community in which people stand in social and political relations of equality to others (Anderson 1999). This aim goes far beyond equalization of capabilities through cosmopolitan politics and towards local expression of equal respect and concern for all citizens. Equity ought to be social and political while participation ought to be democratic. To put it another way, both principles oppose hierarchies (including innovation hierarchies) promoting ‘ … collective self-determination by means of open discussion among equals, in accordance with rules acceptable to all’ (Anderson 1999, 313). Global negotiations of; and agreements on these egalitarian principles, through top-down political institutions, are impossible due to power, inequality and conflict relations (Martell 2008). This is even more so in the area of innovation and development where established hierarchies and dominant value chains reproduce inequality (Cozzens and Kaplinsky 2009) and conflict at the expense of human rights (Juma 2013). What is possible globally is an understanding of the conflicts involved over innovation and development issues.

2.2. Basic needs approach

It might be suggested that emerging innovation models in low- and middle-income countries have to be evaluated through an alternative non-institutional framework that assumes local politics (as opposed to liberal cosmopolitanism politics). In a series of papers (Papaioannou 2011, 2013), I have defined such a framework as public action and campaigning for satisfying basic human needs in an equitable and participatory way. According to Reader (2006, 337)

The “basic needs approach” (henceforth BNA) is an approach to social justice that gives priority to meeting people’s basic needs – to ensuring that there are sufficient, appropriately distributed basic needs (BN) goods and services to sustain all human lives at minimally decent level. BNA draws on the intuitive moral force of claims of need (compared to claims of preference or subjective or objective benefit, for example) to develop a practical normative theory about what should be done.

This approach does not require the overoptimistic establishment of new global structures such as HIF and GIJI. More importantly, it does not presuppose consensus on basic needs to be achieved through negotiations at cosmopolitan forums and top-down institutions. Rather, the basic needs approach (BNA) assumes conflict and alliances taking place in the bottom-up processes of clarifying basic needs.

Although it is true that the BNA has been criticized and eventually overshadowed by capability theory in the early 1990s, it is also true that this approach can be revisited today for the purpose of evaluating emerging models of innovation in terms of inclusiveness. Human needs as such are instrumental. As Wolff (2009, 215) points out, ‘ … needs are always needs for something. But for what? Presumably for the elements of a flourishing life’. It might be said that the very basic elements of a flourishing life are the same for all human beings and their societies. These elements are both natural (life, nutrition, health, etc.) and social (political freedom,
housing, education, etc.). Natural and social basic needs are interrelated. For instance, health is often determined by education, housing, etc.

It might be argued that interrelated natural and social needs can be considered as alternative evaluative criteria of inclusive innovation. The focus here is not just on the outputs of innovation, i.e. equity in the distribution of new goods and services that satisfy basic needs, but also on the process of innovation, i.e. participation in the generation of those new goods and services for basic needs. The advantage of using basic needs as alternative evaluative criteria of inclusive innovation is not only that those criteria are less abstract and more pragmatic than capabilities but also that capabilities as such presuppose satisfaction of basic needs. People remain unable to choose certain functionings unless basic natural and social needs are satisfied. Equal satisfaction of basic needs implies equal freedom from fundamental natural and social constraints. Therefore, each individual’s ability to choose the life he/she wants to live depends on this type of negative freedom. Agreement on and elaboration of an index of basic needs can be only achieved through democratic participation in particular developmental contexts and communities. This takes the form of equal involvement in decision-making and implies a bottom-up process of politics that is different from the top-down process of cosmopolitan politics. The latter is centralized, global and consensus politics while the former is decentralized, local and conflict politics.

The Universal Declaration of Human Rights in Article 25 provides a general approach to basic needs by stating that ‘Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services … ’ (UN 1948). This rights-based approach to basic needs also includes another crucial dimension of social justice, namely recognition of the poor. As Fraser and Honneth (2003) point out, claims for recognition increasingly become crucial because they are put forward together with claims for redistribution of resources and/or capabilities. ‘In the redistribution paradigm, the remedy for injustice is economic restructuring of some sort … In the recognition paradigm … the remedy for injustice is cultural or symbolic change’ (Fraser and Honneth 2003, 13). In the case of inclusive innovation, redistribution might involve policy changes towards equalizing resources and incentives for frugal, grassroots or BRI to meet basic needs while recognition might involve upwardly revaluing disrespected identities of pro-poor innovators (Papaioannou 2013).

Innovations can be inclusive of people and places as long as they can satisfy basic needs in an equitable and participatory way. From this it follows that emerging models of innovation cannot be branded as inclusive unless there is evidence of equal satisfaction of basic human needs in specific developmental contexts. This evidence should not only concern the diffusion of emerging innovations but also their generation. It might be argued that the inclusiveness of the former depends on the inclusiveness of the latter. This argument reconstructs Marx’s position that ‘Any distribution whatever of the means of consumption is only a consequence of the distribution of the conditions of production themselves’ (Marx 2000, 616). If the conditions of generating innovations are not equitable and participatory (e.g. bottom-up, equally involving the poor and taking on board their needs), then the final products, no matter how innovative they are, will be exclusive of the poor and their basic needs. The possibility of inclusive innovation in twenty-first century globalizing capitalism depends on whether the very generation of new products and services allows bottom-up processes of equity and participation to determine the basic needs they will satisfy.

3. New models of innovation for development

So far this paper has clarified the concept of inclusiveness and defended its importance for evaluating emerging innovation models in terms of basic needs. But how should we understand these
models for development? In 2009, a group of innovation and development researchers led by Raphael Kaplinsky at the Open University recognized that dominant paradigms of Mode 1 and Mode 2 innovation\(^5\) in high-income countries either ignore the basic needs of consumers in low-income countries or lack the technologies and organizational structures to address these needs effectively. In 2010, the STEPS Centre at the Institute of Development Studies published *A New Manifesto* confirming that expenditure on research and development across developing countries has risen to approximately 1% of aggregate GDP. Yet outside the emerging innovation centres in rapidly industrialising economies, levels of research and development as a percentage of GDP remain at around 1970 levels in some countries – especially in part of Africa. (STEPS Centre 2010, 6)

Both Kaplinsky et al. (2009) and the STEPS Centre (2010) demonstrate that dominant innovation paradigms based on rent-seeking firms which introduce new products and processes have been exclusive of the poor.

In response to dominant paradigms of exclusive innovation, new emerging firms and value chains are likely to reduce poverty and disrupt global hierarchies of innovation (Kaplinsky et al. 2009). Such firms begin to engage poor people at the bottom of the global income pyramid (BoP) as both consumers and producers who actively participate in driving innovation and growth. The incentives of BoP-serving firms are often reactionary to perceived social injustice in dominant innovation paradigms. Certainly, as a recent report by the Harvard Corporate Social Responsibility initiative points out, the number of ‘inclusive businesses’ in developing countries is still low due to systemic challenges, such as low levels of education, poor infrastructure and regulatory systems (Gradl and Jenkins 2011). Nevertheless, as the OECD (2012) stresses, such emerging models of innovation for or by low- and middle-income groups are essential for inclusive growth. In what follows we take a closer look at these models.

### 3.1. Frugal innovation

The term ‘frugal innovation’ was introduced in India to describe attempts to cut out the luxury and unnecessary features of high-tech products developed for high-income markets (Chataway, Hanlin and Kaplinsky 2013). This new model of innovation has been conceptualized as ‘innovation for low- and middle-income groups’ (OECD 2012, 30). Given that frugal innovations are often lower quality versions of more sophisticated technological products and processes, they allow the poor to buy them at affordable prices, meeting some basic needs and increasing welfare benefits. The OECD has listed a number of cases of frugal innovations. However, for the purpose of this paper, let us focus on two of them.

**Case 1**: Computer-based Functional Literacy (CBFL) in India. This is an innovation inspired by the high percentage of poor people who are illiterate in India. The Tata Group has developed the CBFL technique to teach an illiterate individual to read in a fraction of time, only 40 h of training, at US$2 per individual. This technique is innovative in that it involves animated graphics and a voiceover that explains the relationship between alphabets, structure and meaning of important everyday words. CBFL has so far helped more than 20,000 poor people learn to read and the ambition is for the technique to become available for agriculture and health-care teaching.

**Case 2**: Money Maker Irrigation Pump (MMIP) in Kenya. This innovation was designed by the KickStart International non-governmental organization (NGO), and has been used by some poor Kenyan farmers at a cost of US$100. This foot-powered pump costs less than a diesel pump and can irrigate up to two acres of land per day. MMIP has helped a number of poor farmers to move from rain-fed agriculture to irrigated farming, boosting their annual income.
by US$1000 and increasing crop diversity. KickStart estimates that it has helped to lift more than 400,000 people out of poverty.

Both cases of frugal innovation are driven by demand for cheap products. However, they do not necessarily meet basic education and food needs, as the recent OECD report implies (OECD 2012). The fact that there are differences between lower and higher income groups in terms of demand for such frugal innovations is mainly due to price constraints and not to basic needs. The determining role of cost is also reflected in the cheap modification of products such as mobile handsets and handheld electrocardiograms by north-based transnational companies (TNCs), such as Nokia and General Electric. The objective of these TNCs is not widening access per se but profit from low-income markets with via economies of scale. Indeed, according to OECD (OECD 2012, 37), the promise is that ‘… of accessing new growing markets, such as India and China with their enormous populations. Because even the middle class in such countries has comparatively low incomes, efforts to provide lower-cost alternatives can be attractive’.

Given this fact, the argument that demand for frugal innovations reflects basic needs is only partly correct. Some basic needs for quality food and good education can simply not be met by cheap ‘low tech’ or modified innovations. As will be argued in the next section, inclusiveness is a multi-dimensional concept that cannot be realized if people are offered low-quality products. This might explain why in particular developmental contexts people resist being included as consumers of cheap and low-quality innovations.

3.2. Grassroots or BRI

This is another emerging model of innovation that has been conceptualized by OECD as ‘innovation by low- and middle-income groups’ (OECD 2012, 30). In grassroots or BRI, lower income groups are not just the target consumers but also the innovative producers. This implies that by drawing on indigenous knowledge and relevant technologies and by forming powerful networks of activists, practitioners and organizations, lower-income groups introduce innovations solving practical problems in local communities and meeting basic needs. These innovations might represent incremental changes in existing technological products (Bhaduri and Hemant 2009).

Apart from the large value of grassroots or BRI for low-income local communities, such innovations are considered to be potentially disruptive of global innovation hierarchies. This is not so much because of the introduction of new technologies but because of the new types of consumers who induce grassroots or BRI. As has been stressed elsewhere (Kaplinsky et al. 2009, 192) the existing innovation leaders

… are unable to either recognise or exploit these new opportunities. Their trajectories and market antennae inhibit them from fully recognising these new opportunities which are “below the radar”. Their cost structure – with regard to not just their core component technologies, but also the structure of their value chains – makes it difficult to address these markets, even if they are recognised.

The OECD (2012) and also Smith et al. (2012) have listed a number of cases of grassroots or BRI. However, for the purpose of this paper, we have selected the following two.
Case 3. Grassroots or BRI through the Honey Bee Network (HBN). A number of innovations, including pedal-powered washing machine, groundnut digger, multi-crop thresher, cotton stripper, etc. have emerged in communities at the bottom of the pyramid. The HBN, founded by Anil Gupta, has identified and documented such grassroots innovations while the National Innovation Foundation (NIF) in India has tried to scale them up, applying them to solve similar problems elsewhere. Different methods of information gathering have been used, including active attempts to look for community-based innovations and traditional knowledge. Walking through Indian villages and holding village meetings are some of these methods. The central argument has been that poor people have always been relying on their own ingenuity to solve their problems away from high-technology innovation systems, which are based on research and development (R&D).

Case 4. Grassroots or BRI through the Social Technologies Network (RTS) in Brazil. A number of innovations, including portable water storage, biodigesters for home energy, solar dryers or solar desalters, socio-participatory certification, community gardens, etc. have provided solutions for social inclusion and improvement of livelihoods. These innovations are not only characterized by simplicity and low cost but also by ability to generate income and improve the quality of life of local communities leading to development. They are re-applicable in the sense that they can be recreated and appropriated by local populations (Smith et al. 2012). RTS in Brazil comprises more than 800 public institutions, social movements and NGOs. The main goals of this network are democratization, accessibility and continuous improvement. This implies a normative and political agenda, rejecting control and hierarchies in generating innovative products and promoting creativity of producers and consumers. Grassroots or BRI through RTS in Brazil are based on the recognition that hierarchical technological patterns of the neo-liberal north and profit-seeking innovation, what is often termed ‘the Schumpeterian motor’ (Chataway, Hanlin and Kaplinsky 2013) have so far led to innovation exclusion and poverty. Instead, grassroots or BRI through the RTS can promote inclusiveness involving local communities and transferring their knowledge and innovations to other populations. These are counter-hegemonic technological patterns, which can generate income and employment from communities, social movements and organizations.

Both cases of grassroots or BRI are driven not only by demand for cheap problem-solving products but also by normative and political principles of equity and participation. Indeed these innovations are crucial in terms of empowering local communities to meet their basic needs. In India, as Bhaduri and Hemant (2009) argue, intellectual inspiration for grassroots innovations can be traced back to the teachings of Mahatma Gandhi and Rabindranath Tagore who supported a need-based approach to technology. This is the reason why they are developed and scaled up through local networks and not-for-profit organizations of NGOs. As Chataway, Hanlin and Kaplinsky (2013, 22) confirm, such networks and organizations ‘…remain a considerable source of inclusive innovation today, even though much of this occurs “BRI” and does not surface in many of the measures used to measure innovation such as patents, R&D, sales and trade’.

Grassroots networks and social movements are driven by local initiatives that often challenge social and political structures of marginalization and exclusion, pushing for change (see Fressoli et al. this special issue). As Smith, Fressoli and Hernán (2013, 2) point out

Grassroots innovation is an explicitly normative agenda, which seeks to mobilise distinctly political processes, such as claims to social justice, and often questions organisational and economic assumptions in conventional innovation policies. Alternative initiatives tend to arise in civil society and solidarity economy arenas, where groups experiment with social innovations as well as developing “appropriate technologies” responsive to local situations and needs.
The politics of grassroots innovation is predominantly non-cosmopolitan, going from the bottom-up, based on local community initiatives rather than institutional top-down, assuming cosmopolitan ideals.

4. Evaluating innovation and development in terms of inclusiveness

As has been already pointed out, the OECD (2012) and a number of researchers (Chataway, Hanlin and Kaplinsky 2013; Dutz 2007; Kaplinsky et al. 2009; Lorentzen 2010; Smith et al. 2012) regard new models of innovation for development as inclusive models without providing a normative theory or a clear evaluative framework of innovation inclusiveness. Therefore, the question that still remains open is this: How one can understand and/or evaluate (and even measure) frugal and grassroots or BRI in terms of inclusiveness? To answer this question we should revisit our earlier discussion of the concept of inclusiveness and stress that it is not a politically neutral concept. That is to say, what inclusive innovation means within liberal politics of development is different from what it means within non-liberal politics of development. For liberals, inclusive innovation might be translated as the formal right of everyone to be included in market processes and outcomes. For non-liberals, inclusive innovation might be translated as the substantive and equitable participation of everyone in innovation processes and outcomes, which are not necessarily market led.

Revisiting our earlier criticism of the liberal cosmopolitan approach to inclusive innovation provides us with a good basis for applying or operationalizing our suggestion that the BNA might in fact be a more plausible framework of evaluation. The argument for this suggestion has been that the BNA is a non-institutional framework allowing for new models of innovation such as frugal and grassroots or BRI to be evaluated in terms of their contribution towards satisfying natural and social needs. Given that equity and participation constitute essential criteria of this evaluative framework, the question that arises is to what extent specific cases of frugal innovation (i.e. cases 1 and 2) and specific cases of grassroots of BRI (i.e. cases 3 and 4) satisfy both criteria, meeting equitable needs and improving participation.

To begin with cases 1 and 2, existing evidence suggests that neither CBLF nor MMIP are equitable and/or participatory innovations. Both frugal innovations come at a price that, by definition, excludes those who live below the Millennium Development Goal of US$1.25 per day. The absolute poor in India and Kenya who are unable to purchase CBFL and/or MMIP are unable to meet their need to learn reading/writing skills and/or to improve their farming techniques. In cases 1 and 2, frugal innovations promote inequitable inclusiveness of people and places. This is because they clearly exclude the poorest. CBFL and MMIP cannot be seen as a means of development for everyone. In addition to this, they are not participatory innovations. There is no evidence to suggest that poor consumers were involved in their conception and production. Rather, the Tata Group in India and the KickStart International NGO in Kenya introduced these frugal innovations as rent-seeking enterprises, which can better understand local markets and use locally available resources. In fact, CBFL and MMIP remain ‘innovations from above’ (Chataway, Hanlin, and Kaplinsky 2013), which fail to meet any basic needs of those on the lowest incomes, and which fail to meet the participatory needs of those outside the elite innovatory clique. The same holds for other frugal innovations such as ultralow-cost mobile handsets, solar energy systems for the poor, low-cost word processing, e-mail devices, etc. None of these innovations are absolutely inclusive of poor consumers and places, let alone satisfying the principles of equity and participation in processes and outcomes.

Moving on to cases 3 and 4, existing evidence suggests that both HBN and RTS may be participatory networks but not necessarily equitable. These networks include innovators such as farmers and entrepreneurs, policy-makers, academics and NGOs committed to identifying and
rewarding innovative ideas and traditional knowledge produced at the grassroots level by poor citizens and their communities. Interaction between communities and technology developers leads to adopting and benefiting from grassroots or BRI. However, benefits are not always equally distributed between poor consumers given existing power relations within their communities and wider socio-political structures of inequality. In addition, there are high transaction costs of identification and documentation of grassroots or BRI, and low commercialization prospects. But, despite problems of equity, grassroots or BRI are more likely to satisfy basic needs than frugal innovations. This is for two reasons: first, all, grassroots or BRI are less exclusive of the poorest, i.e. those who live below US$1.25 per day. The absolute poor in India and Brazil are able to use some of the HBN and RTS innovations provided they have a connection to these networks. To put it another way, grassroots or BRI promote collective empowerment for meeting local needs. Through networks such as HBN and RTS, innovation and development cease to be the privilege of specific individuals and begin to include the whole community.

Certainly, more rigorous investigation and critical insights are necessary in order to show how grassroots or BRI contribute to improving the livelihoods of people in low-income communities. In addition, questions also need to be raised about the possibility of such innovations in high-income countries. This is because, as Hernán and Fressoli (2011, 14) stress, social exclusion is not circumscribed to under-developed countries; it is merely more apparent and seems crueler there. However, observing the shortcomings of healthcare systems, the social integration problems and the environmental risks that riddle the so-called “developed” countries, as well as the restriction in access to goods and services, is enough to notice the inability of the market economy to solve key social issues.

Grassroots or BRI might be able to remedy specific market failures in developed countries, replacing innovations that exacerbate social problems.

Despite substantial differences between frugal and grassroots or BRI, in fact, all these emerging innovations are able to help poor people to satisfy some basic needs or, to use Sen’s terminology, achieve some basic functionings under certain conditions. The question is what should the role of public policy be vis-à-vis such innovations? Should public policy support frugal innovations in some contexts (e.g. in communities living above US$1.25 and below US$2.50 per day) and grassroots or BRI in some other contexts (e.g. in communities living below US$1.25 per day)? The answer may be in the positive given the nature of basic needs of these different communities. Public policy should be first concerned with satisfying such needs through frugal and grassroots or BRI, and then with increasing capabilities. As has been stressed earlier in this paper, increasing capabilities presuppose satisfying basic needs. Public policy focused on both industrial and social development can provide combined institutional and financial support to those frugal and grassroots or BRI, which can satisfy basic needs. This support can range from provision of incentives for inclusive innovation to reduction of instabilities and insecurities of frugal and grassroots or BRI innovators. The establishment of NIF in India seems to be one good example. This is an autonomous organization supported by India’s Department of Science and Technology. NIF’s objective is to strengthen grassroots innovations and traditional knowledge. So far it is claimed that NIF has built a database of more than 1,060,000 innovations and has filed over 550 patents on behalf of innovators. The Brazilian Ministry of Science and Technology (MCT) is another example. MCT supports several social technology projects, aiming to improve the functionings of poor agricultural and urban populations. Only in 2004, it is claimed that, MCT spent R$10 million on agricultural projects and in 2005 R$32.2 million went to 278 projects of grassroots or BRI. However, as Smith et al. (2012) observe, attempts to link the mainstream innovation community with grassroots innovation movements
remain embryonic. Despite the support of MCT and the Brazilian innovation agency (FINER), RTS has so far failed to engage R&D institutions and universities. This not only suggests ‘indifference or even resistance’ from the country’s scientific and political elites but also an epistemological, moral and political gap between such elites and grassroots social movements. Scientific and political elites reproduce and/or strengthen the dominant and hegemonic paradigm of innovation because their survival depends on it. By contrast, grassroots innovation communities promote an alternative and counter-hegemonic paradigm that is potentially disrupting of local and global innovation and political hierarchies.

Whatever the outcome of this social and political struggle, one thing is certain: unless public policy supports frugal and grassroots or BRI, which contribute towards meeting local basic needs, a number of community-generated technologies might fail the same way that ‘appropriate’ and ‘intermediate’ technologies failed in the 1970s and 1980s. Yet this support should not necessarily be institutional. Public policy should rather avoid developing more formal/cosmopolitan institutions of innovation. Our research suggests that such global institutions rarely have a BNA-based vision. This explains why they can fail particularly in supporting grassroots innovation. On the other hand, unless a BNA-based vision can move emerging innovation models beyond the local and towards disrupting existing global innovation hierarchies, frugal and grassroots or BRI are also bound to decline.

5. Conclusion
This paper has sought to address the question of inclusive innovation under twenty-first century capitalism. It did so by proposing a non-institutional framework of basic needs focused on the political principles of equity and participation. This framework prioritizes inclusiveness of processes over inclusiveness of outcomes on the grounds that the former presupposes the latter. Emerging models of innovation, such as frugal and grassroots or BRI, can be evaluated as inclusive to the extent that they can satisfy both principles, meeting peoples’ basic needs through non-cosmopolitan politics. Otherwise, they can be thought of as innovations that have no positive impact on inclusiveness. The current academic discussion on inclusive innovation avoids taking a clear normative position or promoting a plausible evaluative framework. Revisiting the basic human needs approach to inclusiveness might close this normative gap. In any case, evaluating emerging models of innovation in terms of needs might provide strong justification for public policy support of frugal and grassroots or BRI in both developing and developed countries.

Notes
1. Both the SM and the ATM failed to change the dominant paradigm of innovation. Technological progress remained a predominantly hierarchical and exclusive process located in the north. On the one hand, the SM only spoke to a very specialized audience of innovation experts in developed countries. On the other hand, the ATM turned science and technology elites in developing countries against ‘economically inefficient’ appropriate technologies, often perceived as an attempt to lock such countries into low productivity and undynamic techniques (Kaplinsky 2009, 2011).
2. Cosmopolitanism is a global political theory that maintains ‘… that there are moral obligations owed to all human beings based solely on our humanity alone, without reference to race, gender, nationality, ethnicity, culture, religion, political affiliation, state citizenship, or other communal particularities’ (Wallace Brown and Held 2010, 1). This implies a notion of common humanity that translates ethically into an idea of common moral duties towards others. Cosmopolitanism puts forward three normative commitments: individualism (i.e. the primary units of moral concern are individuals, not states); equality (i.e. the moral concern for individuals should be equally applied to all); and universality (i.e. all humans are equal in their moral standing as if they are all citizens of the world). Although the
origins of cosmopolitan thought can be traced back to Immanuel Kant (2008), twenty-first century challenges of globalization, including the spread of infectious diseases and the threat of climate change, remind us that events in one part of the world have impact on people in other parts of the world and therefore give contemporary relevance to cosmopolitanism.

3. For Rawls, justice demands equal sharing of liberty and opportunity, income and wealth, and self-respect. This does not imply elimination of all inequalities but only those which put someone in a worse-off situation. In Rawl’s theory ‘if certain inequalities benefit everyone, then they will be accepted by everyone’ (Kymlicka 1990, 53). This theory is illustrated in his two principles of justice. The ‘equal right to basic liberty’ implies that each individual has the right to equal share of resources. The ‘difference principle’ tell us that inequalities in sharing resources are morally justified only in so far as they are to everyone’s advantage. To put it another way, unless such inequalities put someone in a worse-off position, they are morally justified.

4. Non-cosmopolitan politics means politics away from global fora and cosmopolitan institutions. Such institutions often constitute arenas of clashing interests, and values which are dominant in the west but fail to promote economic and political development in poorer countries. Non-cosmopolitan politics promotes social democracy at state level and international alliances locally. This implies a conflict approach to politics (as opposed to consensus or agreement between political actors at the level of cosmopolitan institutions) taking into account clashing material interests and power (Martell 2011). Collaboration can be mainly established locally with those actors who have similar ideological and material interests.

5. The concepts of Mode 1 and Mode 2 innovation were introduced by Gibbons et al. (1994) to characterize and theorize the transition from scientific knowledge production based on disciplinary and experimental research to scientific knowledge production based on interdisciplinary and reflexive research. The latter involves much more stakeholder interests and capacities than the former (Kaplinsky 2009). Mode 2 has come to dominate the innovation process in high-income economies of the north. By contrast, low-income economies of the south are still embedded in Mode 1 innovation, failing to involve poor consumers and other stakeholders.

6. This clarification was suggested by one of this journal’s reviewers. I would like to thank him/her for the contribution.

References


