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Innovation for inclusive development, public policy support and triple helix: perspectives from BRICS

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This paper investigates the role of innovation in (inclusive) development – subsequently referred to as innovation for inclusive development (IID) and the links to public policy in BRICS (Brazil, Russia India, China and South Africa) countries. To achieve this aim, the authors examine the roles played by Triple Helix actors (THA), namely university, industry and government in IID activities across BRICS countries, drawing on the national systems of innovation (NSI) framework. The findings indicate that: (1) significant gaps exist in literature useful in advancing our knowledge of innovation as a mechanism for inclusive development; (2) BRICS countries focus, mostly, on innovation in the broad sense, with less attention paid to IID, the essence of this paper. One reason for this gap may lie in the inability to conceptualize and theorize innovation as a mechanism for including the wider society in socio-economic and development activities, or the lack of appreciation of the potential roles that innovation can play in development; (3) there is absence of specific public policies and policy support for IID in BRICS; and, (4) paucity of empirical evidence needed to critically analyse and explain the roles that THA in BRICS play in innovation ecosystems.

Keywords: innovation, inclusive development, public policy, triple helix, university, industry, government, BRICS

Introduction

Developing countries increasingly face the problem of growing economic inequality and lack of access to innovation for a large segment of their population which is outside the formal economy and formal innovation system (Cozzens 2010; Prahalad 2012). In BRICS (Brazil, Russia, India, China and South Africa) the size of the ‘informal economy’¹ is estimated to account for 32 to 83% of non-agricultural employment (ILO Department of Statistics 2012). Innovation (as a mechanism) for inclusive development (IID) potentially offers one avenue to address the growing challenges of, for example, poverty, inequality and exclusion of large segments of the population from national socio-economic and development activities (Kraemer-Mbula and Wamae 2010; Marcelle 2014; UNCTAD 2014).

IID operates on two principles: enabling participation of marginalized people in the mainstream economy and their involvement in innovative and development activities. In some countries, India for instance, the informal sector reveals extensive innovative activities resulting in effective solutions to development challenges facing rural people and communities. Some of these challenges are unmet by innovations in the formal sector as defined by the national systems of innovation (NSI) framework (Freeman 1987; Lundvall 1992; Nelson 1993). Empirical evidence suggest that the informal sector has the potential to generate various types of innovations (Anderson and Markides 2007; NIF 2013; Brem and Wolfram 2014), such as, radical, frugal, social, and grassroots; some of which have been regarded by scholars in science, technology and innovation (STI) domain as innovations geared towards inclusive development (IID). Such innovations help to integrate excluded people into national mainstream economic activities and formal innovation systems. Relatedly, IID generates specific innovation environment,

challenges, and prospects for conventional NSI actors: university, industry and government – as captured in the triple helix (TH) framework. In this paper, we focus on BRICS.

Establishing conceptual clarity

In establishing conceptual clarity, we use inclusive innovation, innovation, inclusion and IID in the following manner. ‘Inclusive innovation’ comprises ‘initiatives that serve the welfare of lower-income groups, including poor and excluded groups. While growth dynamics have lifted many people out of poverty, they have not eliminated poverty and exclusion, which continue to affect millions of people’ (OECD 2015b, 9). In this paper, we focus on ‘innovation’ in a broad sense, i.e. the application of a new or improved product, process, service, or organizational or marketing strategy that addresses a specific societal challenge or challenges. By ‘inclusive’ we refer to the concept of ‘opening-up’ or ‘broadening out’ innovation, innovation activities, project, services, products and processes, in the broadest possible sense without any form of exclusion. Against this backdrop, therefore, IID as used in this paper refers to innovation in its broad sense that facilitates the participation of the widest possible spectrum of the society in socio-economic development activities. This is different from designing and applying (innovation) products (e.g. M-PESA, Tata Nano) or services (e.g. microcredits) that are specifically targeted at the poor, marginalized or low-income segments of the society. This in itself is exclusion.

The objectives of the paper

BRICS countries have been identified as sharing some common characteristics in areas that include innovation, development challenges and opportunities, and similarities in economic indicators. Our focus in the analysis

Table 1: Economic and social indicators on BRICS versus OECD.

	BRICS					OECD
	Brazil	Russia	India	China	South Africa	
Population in millions	201	144	1211	1357	52	N/A
GDP (in millions)	2246 (2013)	2096 (2013)	1871 (2013)	9185 (2013)	382 (2012)	N/A
Unemployment rate (% of labour force, annual average)	6.6 (2013)	5.5 (2013)	3.7 (2012)	4.1 (2013)	25.1 (2012)	8.1 (2013)
Unemployment rate for population aged under 25 years (%)	14.6 (2012)	13.8 (2013)	28 ^a (2011)	–	51.5 (2012)	19 ^b (2011)
Poverty: Headcount ratio at \$1.90 a day (2011, % of population)	5.5	0.1	21.2	–	16.6	–
<i>Income distribution (2009–2013)</i>						
Income share held by highest 10% of population ^c	41.8 (2013)	32.2 (2012)	30.0 (2011)	–	51.3 (2011)	9.6 (2012)
Income share held by lowest 20% of population ^d	3.3 (2013)	5.9 (2012)	8.2 (2011)	–	2.5 (2011)	–
Gini index ^e	0.50 (2012)	0.42 (2012)	0.37 (2010)	0.47 (2013)	0.64 (2009)	0.31 (2011) 0.32 (2012)

^aAge 15–29 years.

^bOnline OECD Employment database: <http://www.oecd.org/employment/onlineoecdemploymentdatabase.htm>, Accessed: 10 March, 2016.

^cWorld Bank: <http://data.worldbank.org/indicator/SI.DST.10TH.10/countries>, Accessed: 10 March, 2016.

^dWorld Bank: <http://data.worldbank.org/indicator/SI.DST.FRST.20/countries>, Accessed: 10 March, 2016.

^eHigher value indicates a higher level of inequality in a country. 0 = complete equality; 1 = complete inequality.

Source: <http://www.ies.gov.in/pdfs/sunita-sanghi-and-a-srija.pdf>, Accessed: 10 March, 2016.

Source: Adapted from BRICS (2014) and IMF (2015), OECD (2014).

and discussions that follow is to (1) examine the five BRICS countries and identify some of the IID specificities, and (2) examine the role that public policies play in supporting IID in each of the countries. Using the TH, we attempt to outline the roles played by university, industry and government as innovation actors and provide generalizable recommendations across the board. We locate the discussions within the NSI framework as the guiding conceptual and analytic framework.

Some basic information on BRICS

In order to make a case for the need to stimulate IID and the relevant public policy support, it is important to demonstrate why BRICS countries need IID in the first place. In Table 1, we present brief data on BRICS poverty,² Gini Index/inequality,³ and unemployment. We compare the data on BRICS with OECD averages. The aim is to highlight the potential roles that IID can play in addressing societal challenges, such as poverty, inequality and unemployment in BRICS, thereby ensuring that innovation contributes to socio-economic development.

‘Reducing inequality, while at the same time promoting more and better jobs in the emerging economies (EEs), BRICS included, requires a multipronged approach’ (OECD 2011a, 49). We argue in this paper that innovation practices and policies that foster inclusive development are imperative in this multipronged approach. In a ‘Special Focus: Inequality in Emerging Economies (EEs)’, OECD (2011a) records that ‘inequality in Brazil, Russia and South Africa have reached high levels and remain high’ (OECD 2011a, 49). Inequality is still a major challenge, Keeley (2015). As Figure 1 below illustrates, the Gini Index or Coefficient (a proxy for the

measure of [income] inequality) for South Africa is more than twice the OECD average, while Brazil’s is almost twice.

The data presented above help to justify the aim of this paper, that is, the importance of innovation as a mechanism for addressing socio-economic challenges and promoting inclusive development in BRICS. Although we do not analyze these development indicators in-depth, as this is outside the scope of this paper, we argue that they help to demonstrate the importance of IID and therefore deserve a brief mention. Furthermore, these basic data help to provide background information useful in situating the literature review and discussions that follow within the BRICS context.

The rest of the paper is organized as follows. In the next section, we review the relevant literature while in the section following that we briefly explain the methodology. In the next two sections, we present and discuss the findings and then conclude, respectively.

Review of relevant literature

Even in recent studies, literature and policy priority setting (see, for example, IMF 2014; IMF 2016), IID is still not sufficiently considered and recognized as one of the essential mechanisms for global growth and development. This represents a gap this paper seeks to address. Therefore, in order to cover the issues raised in this paper, the review of relevant literature attempts, in broad terms, to address some basic information (such as inequality levels) about each country. The aim is to help contextualize the literature review, analysis and discussions. We also briefly review literature on innovation and innovation system for each country, and highlight TH actors involved in IID support

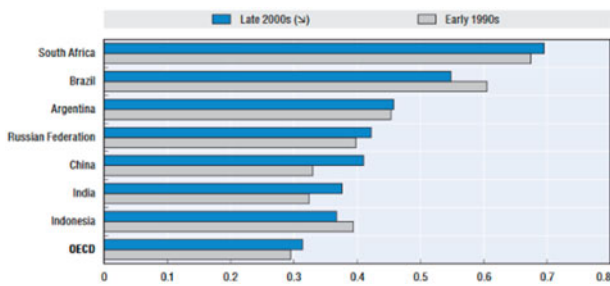


Figure 1: Change in inequality levels, early 1990s versus late 2000s.

Source: OECD 2011a

and related public policies. We provide brief statements, where applicable, on whether there are papers discussing IID and related public/innovation policies. In cases where literature on any of these elements is limited or non-existent for one or two countries,⁴ we highlight it as a gap, which we hope this paper helps to fill.

Triple helix and national systems of innovation frameworks

The triple helix (TH) argues for a shift from bilateral interactions of double helices to interactions of a triple helix consisting of university, industry and government relationships in innovation ecosystems. This makeup, according to the TH framework, fosters innovation, the creation of hybrid enterprises and joint innovative projects in the modern knowledge economy (Etzkowitz and Dzisah 2008, 10; Etzkowitz and Leydesdorff 2000).

As a framework, TH is widely used in the literature to analyze the relationships and interconnections of the main innovation stakeholders of university (or academia), industry and government. Using TH to analyze IID efforts, as we do in this paper, is novel. First, we do not intend to provide an in-depth analysis of TH in this paper. Second, we acknowledge that there is literature which focuses on discussions about the role of other innovation actors such as users, the informal sector and civil society, and the importance of public opinion (see for example, Etzkowitz and Zhou 2006) with respect to TH. However, by using TH, the framework helps to clarify that the paper focuses on the roles played by university, industry and government (U-I-G) in IID. In the discussions that follow, we also draw insights from the national systems of innovation (NSI) framework (Freeman 1987; Lundvall 1992; Nelson 1993) as it acknowledges the role of U-I-G as innovation actors within national systems.

BRICS – Brazil, Russia India, China and South Africa

Scerri and Lastres (2013) show that there are economic, innovation, policy and development complementarities, similarities and sufficient differences among BRICS countries justifying the study and analysis of these countries as a group of nations. The authors stress the need for further extensive studies on BRICS economies and innovation. In addition, they acknowledge that major challenges still remain in these countries in the areas of inequality, exclusion and policy support for innovation. Although the work of Scerri and Lastres (2013)

does not directly address IID, we posit that innovation, as a tool for inclusive development, can be an important mechanism in addressing some of the gaps identified by Scerri and Lastres (2013).

In addition, IID and public (particularly innovation) policies can play significant roles in efforts to lower socio-economic challenges such as inequality (the gap between the rich and poor) and exclusion (Galbraith, Krytynskaia, and Wang 2004; OECD 2011a; BRICS 2014; Keeley 2015), poverty (World Bank 2004; OECD 2011b; IMF 2014) and unemployment (World Bank 2005, 2010; NDP 2011; Gupta 2013; Marcelle 2014; UNCTAD 2014), all of which impact on development.

In the sections that follow, we review some of the relevant literature useful in analyzing IID and public policy, focusing on perspectives from BRICS countries and the roles that university, industry and government (i.e. triple helix actors, THA) play in the processes involved. We start with a review of literature on Brazil.

Brazil

In Brazil, although public policies have played a positive role in promoting innovation, differences in income distribution and inequality remain a source of concern. This strengthens the argument for a new approach to addressing inclusion, combating marginalization and promoting innovation that address societal needs (Cassiolato and Soares 2013). This point highlights the role of IID in public policies.

In a similar vein, Koeller and Gordon (2013) advocate an NSI that adequately addresses the very important connection between innovation policy and development policy, arguing that development policies underpin other policies, including innovation policies. The authors, in line with the characterization of development advanced by Cassiolato and Lastres (2008), stress that there is need to define NSI in ways that suit the contexts and perspectives of Brazil and that attention must be paid to structural implications that have bearings on innovation and development. In addition, they explain that policies have impacts on the roles that institutions play in development and innovation processes. Here, again, we find the need for active interactions and collaborations between TH actors, as NSI stakeholders, in fostering development and policies necessary for supporting IID in fast-developing countries.

Furthermore, the authors observe that in Brazil, structural barriers and ill-conceived intrinsic logic have in the past enabled the perpetuation of underdevelopment. In noting the challenges in the social and economic structures, Koeller and Gordon (2013) submit that these gaps need to be considered during policy formulation and addressed by appropriate development and targeted innovation policies. Here we see a clear case for THA working together in order to foster innovation, enhance policy and achieve development goals. A key role for government, the authors submit, is the formulation of specific policies targeted at IID. In this paper, we posit that for such development and innovation policies to be effective, it is important that they not only focus on mission-oriented innovation projects and activities, but also strive to

Table 2: Findings: triple helix actors roles in IID and policy support.

Triple Helix Actors (THA)			
BRICS Country	University	Industry	Government
Brazil	<ul style="list-style-type: none"> Establishment of incubator movements, science parks, and angel networks by universities, research institutions, firms and municipalities (Etzkowitz and Dzisah 2008) Innovation research, knowledge production and dissemination with context specificity to Brazil (Cassiolato and Lastres 2008) Departure from US and other imported capabilities towards the development and dependence on domestic capabilities (Scerri and Lastres 2013) Greater research, innovation collaborations at national and international levels Connection between innovation policy and development policy; development policies underpin innovation policies (Koeller and Gordon 2013) 	<ul style="list-style-type: none"> Commercialization of IID/grassroots innovation products Firms creating incubators around universities Influenced by government policy and although started in the software sector, the incubator movement in Brazil now permeates the entire innovation ecosystem, involving many professors teaching courses in entrepreneurship, various universities, departments and industrial sectors across Brazil (Araujo and Costa 2014). 	<ul style="list-style-type: none"> The establishment of infrastructure and institutions, e.g. BNDES (Scerri and Lastres 2013) The setup of research centres and boosts in innovation, e.g. Brazilian Innovation Agency and CNPq, the National Council for Scientific and Tech. Development (insert refs). Remarkable increases in innovation investment and new models of funding, e.g. the Newton Fund set up to bolster Brazil-UK collaboration in science and innovation Finance and various other institutions as a way of promoting innovation and fostering development (Scerri and Lastres 2013) Positive impacts from public policies and policy support for innovation in general (Cassiolato and Soares 2013)
Russia	<ul style="list-style-type: none"> Putting IID into policymakers' agenda (Gokhberg and Kuznetsova 2011b) 	<ul style="list-style-type: none"> Lags behind, e.g. China, due to factors that include poor protection of IPR, limited finance, low investments in ICT, low/inefficient R&D and skills gaps (Gianella and Tompson 2007; EBRD 2011) 	<ul style="list-style-type: none"> As semantically IID is not in circulation in policy papers, there are no measures or interventions of government for IID support. The more or less close government initiatives are measures to support social entrepreneurship though providing grants for social entrepreneurs.
India	<ul style="list-style-type: none"> Scouting, documenting of GRI; providing its infrastructure for testing and validation of innovation; providing incubation services for innovators in situ (training); incubator units In general, university became a networking base for pushing GRI movement and involving government and business in its development (Ustyuzhantseva 2015) 	<ul style="list-style-type: none"> Start-up firms, industrial clusters (Basant and Chandra 2007) Commercialization, innovation distribution, mass production (Ustyuzhantseva 2015) 	<ul style="list-style-type: none"> Setting up institutional infrastructure for IID development (NIF, GIAN, GTIAF, and MVIF).^a Created institutions provide IID with micro venture finances, help in patenting, business incubation (NIF, 2006–2012). Awards, competitions and exhibitions to scout and develop the best innovations for inclusive development
BRICS Country	University	Industry	Government

(Continued)

Table 2: Continued.

BRICS Country	Triple Helix Actors (THA)		
	University	Industry	Government
China	<ul style="list-style-type: none"> • Selection, improvement and diffusion of technology (Yao, Mosi, and Xiaodong 2015) • Dissemination and absorption of knowledge, access to science and technology knowledge (Yao, Mosi, and Xiaodong 2015) • Primary intermediary service, training skilled labour and educating high level talents (Yao, Mosi, and Xiaodong 2015) 	<ul style="list-style-type: none"> • Builds cross-sectoral value network (Xing, Tong, and Chen 2010) • Integrates stakeholders' capability and resources, thus improving value chain imperfections and institutional void in BOP market (Xing, Tong, and Chen 2010) • 'Triggers' and leads inclusive innovation activities in NSI (Yao, Mosi, and Xiaodong 2015) • Provides insight into real or potential demand of low-income people, R&D activities, flexible and low cost manufacturing systems, customized distributing channels and market promotion (Yao, Mosi, and Xiaodong 2015) 	<ul style="list-style-type: none"> • Provides rules, regulations makers and of innovation activities, act as enablers (Yao, Mosi, and Xiaodong 2015) • Policymaking, provides innovation, a conducive environment and risk protection mechanisms; builds relationships and trust among stakeholders (Xing, Tong, and Chen 2010) • Sets up institutions beneficial to inclusive innovation and eliminates barriers (Shao, Xiao-qiang, and Yun-huan 2011) • As an enabler, improves the efficiency and diffusion of regional inclusive innovation and helps the poor build capability (Shao, Xiao-qiang, and Yun-huan 2011) • Provides financial support and subsidies, help to set up production bases, to help expand the domestic and overseas markets (Xing, Tong, and Chen 2010)
South Africa	<ul style="list-style-type: none"> • Support for the capability of researchers within public research institutions. • 'Entrepreneurial universities' – manage and process contracts, patent applications, royalties and protecting IPRs, consultancy, university-owned companies (on innovation, not necessarily for IID in all cases) • Incubators; • Carry out, co-ordinate and support research activity in general, and contribute to firms' innovation (Kruss 2008) • Bringing updated knowledge from developed countries to existing local firms – relevant for IID (Albuquerque et al. 2015) • Fostering interactions, knowledge exchange, and learning processes with industry (Albuquerque et al. 2015) 	<ul style="list-style-type: none"> • Production of 'consumer goods serving low income/BoP markets (through the BoP learning lab)' (COFISA 2009, v) • Harnessing existing 'points of interaction' between universities and private research institutes (Kruss 2008; Albuquerque et al. 2015) • Increasing use of external knowledge partners (universities, public research institutes and technology centres) • Taking advantage of innovation-related capabilities, specialized selection (in firms and SMEs alike), greater interaction (with suppliers and users), networks, strategic cooperation (Albuquerque et al. 2015) – mostly focused on innovation in general, not necessarily for IID in all cases. 	<ul style="list-style-type: none"> • Funding R&D and innovation (not necessarily IID) through relevant agencies, e.g. Human Science Research Council (HSRC); 'Entrepreneurial State' initiatives – government entities – start entrepreneurial projects • Supportive government programmes, such as THRIP, Innovation Fund, sectoral and other Special Purpose Vehicles, as well as plans for a Provincial Innovation Council and a Regional Innovation Forum (Kruss 2008; COFISA 2009) • Knowledge production/circulation, e.g. IID seminars, workshops, stimulating collaborations (COFISA 2009) • Government initiatives and funding seen as promoting innovation networks, partnerships and interactions between universities, industry and government (Kruss 2008) • Policymaking, though not entirely yet clear how effective these are (Phiri et al. 2013)

^aNational Innovation Foundation (NIF), Grassroots Innovation Augmentation Network (GIAN), Grassroots Technological Innovation Acquisition Fund (GTIAF) and Micro Venture Innovation Fund (MVIF).

Source: Based on research data

address grassroots innovation⁵, recognized as IID in this paper. This balance is essential for development. Nevertheless, significant gaps remain in the literature both on IID and policies.

Building on the notion of innovation as the engine of economic growth, Koeller and Gordon (2013), in analyzing Brazil, recommend that innovation policies should be thought of as development policies. This recommendation however carries with it some caveats, e.g. growth does not automatically imply development. In order to reach development, innovation policies must be integrated with development policies, and be specific to the context of underdevelopment, for instance in the areas outlined above – poverty reduction, inequality and employment. We argue that to help address these (under)development challenges, THA have important roles to play through the formulation of policies, scaling up (where applicable) and use of innovation projects, activities, products and services that are inclusive.

Russia

The concept of inclusive innovation emerged in developing countries, as a result of poverty, people's lack of access to their basic needs (food, clean water, housing) and because they were deprived of the benefits of scientific and technological progress (Mohnen and Stare 2013). However, inclusive development is considered as a process of socio-economic integration (Foster and Heeks 2013), aimed at providing access to basic goods and services and meeting the needs of marginalized groups of society, mainly at the bottom of the pyramid (World Bank 2013). We have discussed our preference for and use of IID in the first section of this paper. We retain the 'inclusive innovation' phrase in cases where authors have specifically used it or where it appears in the literature being reviewed to reduce the chances of misrepresentation, for example, as in this instance and in the discussions on India, below.

The analysis of Russian scientific literature reveals an obvious delineation of the study of socio-economic development of Russia and issues related to innovation development (Sokolov 2006; Gokhberg et al. 2009). The first time the question of inclusion in innovation policy was raised in expert discussions on Russian development strategy was in 2011. The strategy discussions examined this issue in terms of inclusion of Russia's wider population in the innovation process with the aim of achieving two goals, to: (1) overcome social disparities and (2) involve the wider society in innovation activities. Citizens have to see themselves as part of innovation and development processes (Foresight 2011).

The final results of the discussions were summarized and included in Russia's innovation development scenario. For the first time, the social function of innovation, including the integration of vulnerable groups in the innovation process, was included in a strategy developed by experts and proposed to the government for implementation (Стратегия 2020 2011). In support of the proposed strategy, various scholars published a number of papers devoted to the importance of integrating social needs into national innovation policy. Gokhberg and Kuznetsova

(2011a), for example, emphasized the need for integrating vulnerable population groups into innovation processes as one of the key directions of public regulation aimed at supporting innovation in Russia.

The authors consider inclusive innovation as part of the social function, which they argue, also includes the development of human capital in the innovation sphere and supporting the creative class. In another work, Gokhberg and Kuznetsova (2011b) identified three main sets of possible inclusive innovation support programmes: support for youth and children creativity; development of mass innovative entrepreneurship through building a system that promotes creative ideas; and inculcation of innovative products and practices into social services, healthcare and other public services which are provided for vulnerable groups of society. Thus, innovation for inclusive development entered policymakers' agenda. However, experts noted that the implementation of this strategy might be limited by political opportunities in Russia (Дмитриев 2011).

Various Russian scholars, mainly economists, who examine the Russian innovation system within the concept of the triple helix, reflect a general tendency to underestimate society (and its needs) as one of the main actors in innovation processes (Маховикова and Ефимова 2010; Smorodinskaya 2012). Triple helix in the Russian context is interpreted as the networking of academia, industry and government, with a predominance of pair communications where government is always one party in each communication (Smorodinskaya 2011; Dezhina 2014; Zaini, Lyan, and Rebentisch 2015). In this context, industry and academia build their relationship indirectly, through government agencies and officials. Issues of government innovation policymakers' accountability to society and innovation benefactors have also been raised (Dezhina and Kiseleva 2008). Despite the acknowledgement for the need for innovation in Russia, innovation is still considered in terms of providing cross-sectoral interaction at the level of the region or industry (Акбердина and Мальшев 2011; Smorodinskaya 2011; Пахомова 2012), with far less attention paid to the inclusion of the wider society in innovation processes.

India

India demonstrates great potential in building an IID ecosystem, which could not happen without systematic support from the government through policy initiatives and measures. At policy level, the idea of inclusive development has been stated in various documents (11th Five-Year Plan 2012; Mid Term Appraisal 2012; Ustyuzhantseva 2014), although the issues of social development and poverty reduction through inclusive growth arose before. The Indian government stated inclusive growth as one of the basic goals of legislation and budgetary allocations (George, McGahan, and Prabhu 2012). The grassroots innovation movement started in India in the late 1980s as a scouting for and documentation of innovation developed by ordinary people, i.e. grassroots innovators. One of the most important findings of research devoted to this movement was reference to the base of pyramid

(BoP) as a source of innovation, and not just as innovation recipients (Gupta 2006). Thus, by 2007, scholars had considered the development of inclusive innovation in two ways. The first was in increasing capacity of formal institutions to meet the needs of BoP (Utz and Dahlman 2007), while the second was in promoting and supporting grassroots innovation (GRI) through adding value to these innovations (Gupta 2007; Utz and Dahlman 2007).

In India, inclusive innovations are mostly considered as grassroots innovations (Gupta 2006), frugal innovations, which are often called 'jugaad' (Rajou et al. 2012), and innovation for the BoP (Pralhad 2004). Gupta argues that 'jugaad' innovation cannot be considered as inclusive innovation, as, in fact, it is a makeshift approach, not geared towards sustainable solutions (Gupta 2014). As we have argued earlier, a more appropriate approach to 'inclusive innovation' would be to conceptualize it as innovation – in all its forms – used for inclusive development that seeks to involve the entire society as much as possible. Nevertheless, GRI has become one of the main focuses of India's government policy measures and infrastructure to support and promote inclusive innovation.

India's innovation policy and innovation systems research ecosystem has evolved around the broad OECD framework, upon which a country's innovation system is analyzed from the perspective of technical innovation and the supporting system (Oslo Manual 2005; Sinha 2011). OECD's efforts at formulating an inclusive growth agenda began in 2012. The first evaluation of Indian innovation policy with regard to inclusive development was done at the OECD Conference in Paris in 2012. It was observed that despite the relatively early emergence of the 'inclusion'⁶ concept in India, the top-down model of innovation development had prevailed. So, this model has not provided inclusive growth in India (Krishna 2014). The economic reforms of the 1990s resulted in rapid economic growth and the development of innovative industries. However, this growth also brought issues of growing inequality and the need for inclusive growth into the political discourse (SIP 2015).

Utz and Dahlman (2007) highlighted a number of IID challenges in India such as high transaction cost of documenting innovation, the need for systematic and extended value addition, commercialization through diffusion and dissemination, funding of industrial production and distribution of innovation. The authors proposed a number of initiatives and interventions for government, business and NGOs useful in overcoming the challenges. For example, they drew attention to the efforts of the informal sector to create and absorb knowledge and to the grassroots innovation initiatives in particular. Besides the need for an assessment of the impact of this innovation on improving the livelihoods of people in the informal sector, the authors recommend such specific measures as creating a national fund to acquire rights to grassroots innovation, developing common fabrication laboratories and testing centres for innovation validation, and developing a nationwide strategic plan to add value to local knowledge, innovation

and practices through collaboration with public and private R&D institutions.

The government applied some of the proposed initiatives. For instance, India has placed inclusive innovation as a main policy focus for the 2010 decade (OAPM 2011). It includes the creation of institutional and financial infrastructure for inclusive innovations (such as National Innovation Foundation, India Inclusive Innovation Fund and Micro Venture Innovation Fund) (Heeks et al. 2013; Ustyuzhantseva 2015). Despite such impressive steps, efforts to capture inclusive innovation at policy level are still evolving. The new science, technology and innovation policy, which was released in 2013, pronounced Indian society as the main NSI stakeholder (STIP 2013). This new policy, however, has been criticized for replicating old and ineffective 'linear model of innovation' (Krishna 2013).

China

Inclusive growth is an indispensable solution to China's future development. Taking full advantage of the enormous consumption, production and entrepreneurship potential contained among the poor, inclusive innovation not only provides enterprises with the competitive advantage difficult to imitate (Zhao et al. 2014), but also offers equal opportunities for the poor who survive at the social network margin to participate in economic growth, make a contribution and share reasonably in the fruits of growth (Tang 2013; Xing, Zhou, and Tong 2013).

The birth of inclusive innovation in Chinese scholarship was greeted with theoretical research. Wu and Jiang (2012) proposed three theoretical mechanisms on how inclusive innovation promotes inclusive development, namely, reducing barriers, upgrading ability and changing institutions through innovation in the perspective of social exclusion. Li (2013) submits that in China institutional arrangements based on cooperation is the way to realize inclusive growth.

Empirical studies, such as Gao, Zhou, and Cao (2013) conceptualize 'inclusive industrial innovation' and propose that it is necessary to establish and improve the public service system, improve the income distribution system, carry out market-oriented reform, and transform government's functions in order to achieve the goal of inclusive industrial innovation. Xing, Tong, and Chen (2010), in a multiple case study carried out on six business enterprise operations in the rural areas of China, found five key components of an enterprise's business model, namely: local capability, value proposition, value network, key activities and profit model. Tang (2013) explored five factors that influence inclusive innovation behaviour of Chinese small and micro technology-based firms. These are capital, allocation of resources, organization network, agency, partnerships and entrepreneurship of the CEO.

However, most research on inclusive innovation in China is conducted from the perspective of innovation systems – because inclusive innovation faces challenges such as lack of market information, deficiency in knowledge and skills, imperfect institutional systems, backward infrastructure and limited access to financial services.

These constraints cannot be solved by a single enterprise, but should be supported by other stakeholders, such as government, NGOs, local communities, research institutes, universities, financial institutes and intermediary institutions. Thus, regional inclusive innovation systems can be constructed by the three subsystems: ‘innovation entity subsystem’, ‘innovation support subsystem’, and ‘innovation environment subsystem’ (Shao, Xing, and Tong 2011).

Gao, Liu, and Zhou (2014) propose an evaluation system for Chinese inclusive innovation system by introducing a comprehensive evaluation method. The result shows that Chinese (regional) inclusive innovation performance declines from the east to the midwest and is closely linked to local economic development, openness and industrial structure. The implication for development is that more attention should be paid to rural areas and regions, underpinned by the national systems of innovation framework and innovation systems thinking, as opposed to economic development at national level. The recommendation is for China to maintain a reasonable industrial structure, build a balanced innovation system and avoid the polarization of resource allocation. It is hoped that this will enhance innovation efficiency and performance.

South Africa

Addressing poverty and inequality is South Africa’s greatest challenge – Foreword, by Asad Alam, Country Director for South Africa, World Bank. (World Bank 2014)

Evidence from South Africa demonstrate the existence of close cooperation between industry and the higher education sector, as well as between university, industry and government (Kruss 2008). The essence of these interactions is to help bridge identified gaps in education and skills, with the ultimate aim of knowledge generation and dissemination. Studies have also focused on the nature and forms that these interactions take. However, little is known about how these cooperations influence IID and related policy, which this paper investigates. Kruss (2008), in analysing these interactions, explored the shifting relationships and partnership between triple helix actors, and the impact this has on research in universities, and on knowledge production and dissemination in South Africa. In this analysis, Kruss found that old and new forms of organizational relationships co-exist, with old forms tending to prevail, arguing that these may have counterproductive implications, thus advocating a balance between old and new forms of partnership, each with its peculiar functions and the creation of new forms of ‘knowledge-intensive networks’ (2008, 3, 15).

Consequently, we observe that all three levels of government (national, provincial and local), as well as public research institutions, are involved in supporting innovation in South Africa (COFISA 2009, 24). The presence of science and technology parks, which act as vehicles for university-industry cooperation, further demonstrate South Africa’s resolve to enhance economic development through science, technology and innovation (COFISA 2009). However, in spite of these efforts, challenges remain in areas that include measurement of innovation,

capabilities (organizational and individual), limited attention to innovation in most of academia, the role of THA on IID and public policy support for IID (COFISA 2009, 47; OECD 2012, 2013a, 2013b, 2015; Daniels forthcoming).

There are also concerns related to government initiatives seen as impediments to innovation networks, an example of which is the intellectual property act, although designed in good faith ‘may stifle, rather than support innovation’ (COFISA 2009, 56). As Phiri et al. (2013) maintain, policies adopted in South Africa’s post-democratic era ‘have produced and reproduced social and economic inequalities which have hampered inclusive innovation, development and the nascent burgeoning of innovation in the informal sector’. Some studies have observed that in spite of the acknowledged cooperation and interactions among triple helix actors, and the potentials of IID in South Africa, efforts aimed at addressing the needs of the poor and marginalized people are still at their rudimentary stage (Lorentzen and Mohamed 2009; Pogue and Abrahams 2012; see also, for example, Soares and Cassiolato 2013). In addition, the ability and efforts to measure IID’s contributions to South Africa’s national growth and socio-economic development is still weak (Daniels 2014; Daniels forthcoming). These gaps and weaknesses identified are not peculiar to South Africa or BRICS, but rather a situation currently prevailing in many other global South countries, resulting in part from the choice of measurement indicators. We provide more insights on these points in the discussion section.

Synthesizing the insights from the literature reviewed

In this paper, we have chosen to explore individual countries independently in the review of literature, while taking the opposite approach in the discussion, i.e. discuss the findings from the countries together as a whole. The rationale behind this stems from the reasoning that a cross-country review for the individual actors⁷ involved in IID in each of the BRICS countries examined would be impractical to achieve within the limited length of a journal. This underpins the rationale for doing a country-level review as opposed to an actor-level review.

In examining the literature, we find gaps in the way that IID is conceptualized and theorized. We note that such gaps increase the difficulty of academic research and operationalization in industry, and limit our knowledge of IID ecosystems, institutions (formal, informal, intermediaries, hybrids), landscape and dynamics (Kruss 2008). We also observe the lack of suitable indicators and the inability to effectively measure the impact on and contributions of (inclusive) innovation on socio-economic development (Kraemer-Mbula and Wamae 2010; OECD 2012). Against this backdrop, we argue in this paper that there is a need to diversify IID literature from case studies on isolated products and services, towards providing a more macro approach, which we do in this paper. The insights from our analysis of the literature on IID reveal that IID can be a useful mechanism for ensuring that the benefits of innovation are optimized, while also remaining relevant to poor and rural communities.

Methodology

In synthesizing the insights from the literature review, we provided the rationale for doing a country-level review as opposed to an actor-level review. We draw from academic materials that support, disprove or justify the existence (or not) of IID, the roles of university, industry and government (as triple helix actors [THAs]) and appropriate public policies that support (or not) IID in BRICS. The sources of data utilized also include project and official government (e.g. strategy and policy) documents. Furthermore, we build on our knowledge and experience of this sector. While some documents draw extensively from primary data captured in the respective countries, others build on materials from international scholars, authors and organizations external to the respective countries.

Given that this paper is of exploratory nature and part of the initial stage of an IID research agenda we recently embarked on, we see the findings and research questions posed as starting points that should be followed by further empirical research to verify information and gain a greater depth of understanding of the issues addressed. The data analysis methodology follows the TH framework and focuses on the roles of three main innovation actors: university, industry and government (Table 2).

Discussion

Cassiolato and Lastres showed that development is neither linear nor sequential, but rather is a unique process that 'depends on several aspects related to political, economic, historic and cultural specificities that occur from long-run structural changes that generate ruptures with historically established patterns' (2008, 7). In this sense, we see the importance of context-specificity, learning, innovation, instability (ruptures and reassembling) and dynamism as exemplified by the triple helix framework, thus linking back to the active engagement and roles played by triple helix actors.

The findings highlight roles played by university, industry and government in innovation, with bearing on IID. With two billion BRICS citizens estimated to join the global middle class by 2030 (Cassiolato and Soares 2013), this potentially has a significant impact on global poverty levels, inequality and social exclusion. Brazil presents an example of THA role in innovation by the establishment of incubator movements, science parks, and angel networks by universities, research institutions, firms and municipalities. This has helped to advance knowledge capitalization and the 'realization that the incubator is fundamentally a teaching programme for individuals to learn to function as an organization', not simply an activity reserved for firms (Etzkowitz and Dzisah 2008, 5).

Other financing mechanisms, institutional settings, organizational interfaces and knowledge production and dissemination arrangements are being put in place. Brazil presents an interesting and important example of government support for innovation through efforts that focus on the creation and strengthening of science and technology (S&T), finance and various other institutions as a way of promoting innovation and fostering development (Scerri and Lastres 2013). Efforts in this direction

include the creation of National Bank for Social and Economic Development (BNDES).

At the 6th BRICS summit in July 2014, the creation of BRICS Bank, seen as a 'rival' or 'alternative' to the US-dominated World Bank and IMF, is another such step that echoes this strategy (Griffith-Jones 2014). These steps reflect the choice of development and innovation strategies designed to achieve self-sufficiency, or, at least, less dependence, on external capabilities and finance while Brazil charts its development course. The results have been astounding, with world-renowned scholars such as Nobel Economist Joseph Stiglitz in support of the paradigm shift and originality in approach.

In knowledge production and dissemination, we see Brazil involved in international research and innovation collaborations, financed by government agencies⁸ (e.g. BNDES) with a view to improving understanding of how innovation can better serve humanity and respond to global challenges. How these collaborations between TH actors contribute to IID is yet to be measured in precise terms. Nevertheless, they signal interest towards advancing research and innovation and demonstrate commitments by the nation's THA focused development strategies.

In spite of these incubators, knowledge and finance initiatives, increases in capital, investment, growth and development recorded in Brazil, 'the Brazilian economy, despite the liberalization process in the 1990s, remains the most closed amongst the BRICS countries' (Scerri and Lastres 2013, 28). The focus on the creation of formal institutions means that significant attention is shifted from the informal economy and sectors, which as we know, accounts for a significant proportion of innovation in BRICS countries and the global South in general (ILO 2012). The implication is less support for innovation practitioners at grassroots level, thereby impacting negatively on IID and similar efforts with potentials to address the needs of the poor and marginalized segments of the economy. We submit that maintaining this balance is critical to inclusive development and that careful operationalization of the triple helix framework in this context presents an opportunity towards achieving this goal.

Russia has the weakest presentation of IID agenda among BRICS. In Russia, IID is not yet recognized at the level of national innovation policy, although progress is slowly being made in this regard in terms of supporting social entrepreneurship. The national strategy on innovation development is yet to address social innovation components and does not adequately consider society as a beneficiary of development arising from innovation. As pointed in the previous section, the role of industry in innovation in Russia lags behind countries such as China. In addition to the reasons provided earlier, other factors include the low share of industry enterprises performing technological innovation, 9.4% of all industry enterprises, with more than 75% of these companies being large business. Small businesses involved in innovative activity account for 4.8% of small enterprises out of the total number of small-scale business (Малое и среднее предпринимательство в России 2014). Thus,

the general level of innovative activity in Russia is considerably low. It is still too early to tell whether recent government initiatives (e.g. the Skolkova project) and policy changes aimed at encouraging innovation in academia and industry have been successful (EBRD 2011).

Why does academia not involve industry in IID discussions in Russia? Consideration of the main actors from the triple helix model perspective is helpful in answering this question. As Smorodinskaya (2011) explains, one-on-one interactions dominate in the Russian quasi-market economy and government is an indispensable participant in these interactions. This results in the exclusion of direct interaction between industry and academia, which can only occur through intermediary bureaucrats. But IID is mostly a product of joint involvement of all NIS actors, based on knowledge, innovation and consensus spaces (Etzkowitz and Ranga 2010). So, as long as there are no or weak knowledge, innovation and consensus spaces in Russia, the IID agenda will stay out of industry and can only be transferred to industry by government.

Among the BRICS countries, India has one of the most developed IID support systems. The academic sector was the trigger that created the system through first involving government agencies and then industry. In fact, academia initiated the knowledge and innovation spaces between industry and government to reveal and recognize grassroots people as the main source of knowledge. Students and academic staff initiated scouting and documenting IID from the grassroots. If an innovation with market potential is identified, it is transferred to the incubation system, arranged by the government through various institutions, which provide a wide range of services such as testing, validating, patenting and business incubating. If the innovation is of social importance and aimed at improving citizens' livelihoods, but has weak or no market potential, it is eligible for other forms of institutional support, for example by the Grassroots Technological Innovation Acquisition Fund (GTIAF). The GTIAF acquires rights to technologies for generating public goods from the innovators and escalates the process of awarding the people who developed GRI.

The other option for grassroots innovators is to become entrepreneurs under the support of the Micro Venture Innovation Fund (MVIF), which was set up with financial assistance from the Small Industry Development Bank of India (SIDBI). These organizations provide financing exclusively for risky innovations with limited or no commercial market. One of the main criteria for the selection of projects for funding is their social value and social benefit.

These measures and initiatives are supported in various policy documents released by the Indian government. The main message of the 11th Five-Year Plan (2007–2012) is a statement of the Indian specific way of innovation development, aimed at improving the quality of people's lives through innovation (11th Five Year Plan 2007). This approach was developed further in the 12th Five-Year Plan (2012–2017). According to the Plan, the Indian model of innovation should provide affordable innovations to meet people's needs (in

transport, healthcare, water resources, etc.) and ensure inclusive growth of the country. The New Science, Technology and Innovation Policy released in 2013 declares society as the main goal of innovation development and the central stakeholder of the national innovation system that is supposed to ensure inclusive innovative development of India (STIP 2013).

In the case of China, the Chinese economy recorded a 7.4% annual growth rate in 2014 (IMF 2014) with growth of up to 10% reported in previous years. But this growth performance has come at a high cost, as the gap between rich and poor (i.e. inequality) has widened dramatically, and the environment has suffered immense damage. What is more, this growth has not brought citizens sufficient benefits, as it has been driven more by investment than consumption.

China's 12th Five Year Plan (2011–2015) places great emphasis on 'inclusive growth', promoted by the Asian Development Bank (ADB). The concept of inclusive growth and inclusive innovation is an attempt to transform China's economic and social development model. It seeks to address rising inequality and create an environment for more sustainable growth by prioritizing more equitable wealth distribution, increased domestic consumption, and improved social infrastructure and social safety nets. During 2009–2010, President Hu Jintao raised the concept of 'inclusive growth/innovation' in three important public speeches, appealing that the fundamental purpose of such growth and innovation should be to ensure that the fruits of economic globalization and economic development benefit every citizen.

In spite of its chequered history, recent evidence indicates that South Africa is making efforts at using innovation and public policies as mechanisms for inclusive development. For example, conceptually, South Africa prefers the notion of 'innovation for inclusive development' as opposed to 'inclusive innovation'. In addition, the country aims to have inclusion as part of all public policies, institutions and projects in contrast to approaching inclusion only in terms of innovation (OECD 2015a; 2015b). It is important to point out that this was not the case in the past. Phiri et al., for example, submit that policies adopted in South Africa's post-democratic era 'have produced and reproduced social and economic inequalities which have hampered inclusive innovation, development and the nascent burgeoning of innovation in the informal sector' (2013, 1). As Daniels (2014) and UNDP (2014) found, appropriate public policies required to promote and support the contributions of innovation to socio-economic development are either non-existent or weak across developing countries; not in South Africa alone. Therefore, the strategies being proposed and adopted (see for example, NDP 2011) attest to the country's commitment to IID and the role of public policies in this regards (UNDP 2014).

The IID agenda is viable in BRICS. The governments of these countries realize the imbalanced character of growth and the potential of IID to address these imbalances. The presence of the IID agenda at a policy level in Brazil, India, China and South Africa proves this. These governments take the role of facilitator of IID

through the creation of institutional and financial infrastructure. Industry becomes a more active participant in these processes, not just through producing goods for BoP, but also through building capacities for adding value and commercialization of IID developed by BoP. The same trend is observed for academia. Besides 'traditional' functions of knowledge production and dissemination, academic institutions establish incubators, testing labs, angel networks and other items of infrastructure and become a networking base for industry and policymakers.

The case of Russia demonstrates the importance of such networking and horizontal interactions between actors. Russia is the only country among BRICS that does not have an IID agenda at policy level. In view of weak private finance and institutional infrastructure for innovation development, the government remains the dominant actor, framing the core and direction of innovation activity, and the main source of financial support for innovation both in academia and industry. Through programmes and strategies (social, economic, innovation), and the funding of certain activities, the state delineates the fields of activities for the actors in the national innovation system. The bilinear model of communication between these actors obstructs the exchange of ideas and information about societal demands. This explains the situation when the IID agenda, which was raised by the expert community, was not accepted by the government and developed at policy level.

In summary, we draw some important lessons, based on this analysis of BRICS. We find that: (1) BRICS countries mostly focus on innovation in general, with far less attention paid to IID, the focus of this paper. One reason for this gap may lie in the weak conceptualization and theorizing of IID or the lack of appreciation of the potential roles of IID; (2) absence of specific public policy support for IID in BRICS; (3) emphasis on a narrow view of innovation as opposed to a broader, macro and all-encompassing view, provided that the innovation addresses socio-economic societal challenges; (4) dearth of capabilities needed to support and promote innovation as a mechanism for inclusive development; and finally, (5) gaps in the literature that advances knowledge of innovation inclusive development.

Conclusion

In this paper, we have drawn from various pieces of literature in order to improve our understanding of IID in BRICS. We explained some of the roles that TH actors, as a source of knowledge and innovation, play in the process. The insights are useful in addressing important developmental challenges facing BRICS. BRICS countries, like other 'late-developing societies' (Kruss 2008, 5) face their burden of inequality and the challenge of fostering socio-economic development with strong innovation capabilities while combating social exclusion (Arocena and Sutz 2003). However, drawing from the findings of this paper and the fresh insights that can be gleaned, we conclude that BRICS countries, except for Russia, are actively engaging in activities and public policies to both support and promote innovation in the broad

sense, but less so in the case of inclusive innovation as a mechanism for inclusive development.

As noted earlier, Russia remains the only country among BRICS countries that does not have an IID agenda at academic or policy level. This situation, we explained, is exacerbated by weak private finance and institutional infrastructure for innovation development, and the government's dominant role in framing the core and direction of innovation activity, while, at the same time, acting as the main source of financial support for innovation both in academia and industry.

In India, we find the active involvement of THA in IID support and development with the academic sector as the main driver of these processes. IID was 'discovered' in the informal sector of economy and identified as GRI. This determined the specifics of its support – mostly at institutional level. Despite that the need for inclusive growth is recognized at policy level, there are still no detailed programmes or plans for implementation of this growth. Instead, measures are taken by institutions and organizations of THA to support people, businesses and production cycles for innovative ideas at grassroots. There is a lack of evaluation and measurement of effectiveness of GRI, which might be an impediment in development of programmes at policy level.

China presents an interesting case in which although IID and policy support exist, some scholars argue that university and research institutes, which play a central role in innovation, are excluded from the inclusive innovation system (Xing, Tong, and Chen 2010; Gao, Zhou, and Cao 2013).

These findings highlight questions such as: Should academic actors be involved in, for instance, grassroots innovation and if yes, to what extent? Should firms (industry) 'interfere' in informal sector innovation and if yes, how, why and under what circumstances? This paper substantiates the perspective that THA should be more engaged in IID. This argument serves as a contribution to theory, thus adding theoretical value to the country-level descriptions we provide in this paper.

On the basis of these analyses and findings, we conclude that TH actors can play important roles in areas that include measurement and analysis of innovation/IID, promoting IID, initiating and participating in IID policymaking (formulation, implementation, reviews, monitoring and evaluation), linking formal with informal (sectors, actors, knowledge), development of capabilities, and strengthening innovation ecosystems in ways that support IID. Another area of importance is in ensuring that innovation is relevant to the wider society, and better targeted at excluded and marginalized sections of the population, particularly those at the bottom of the pyramid.

These recommendations we conclude are critical to ensuring that the gains of innovation are optimized and that innovation is applied in a more efficient manner to address societal challenges aimed at improving the quality of life. In the specific cases of BRICS, the use of IID approaches, projects and activities is necessary to achieve and maintain balanced growth and development strategies that are not only smart (i.e. innovation-led) but

also do not exacerbate poverty, inequality and social exclusion. IID can be a useful tool in achieving the socio-economic and development goals of BRICS.

Further research

In summarizing the insights from this section, we note a mixed picture in BRICS THAs' roles in IID, with considerable impacts on development. Our findings reveal that India and China show the best levels of performance among BRICS countries, followed by Brazil and South Africa, while Russia lags significantly behind. Nonetheless, BRICS countries are all making an effort, but specific questions still remain, which further research could examine. Some of these questions are: How can or should a TH framework function in the context of IID and in the way it links to public policy for IID in BRICS? What (new or additional) roles are there for THA in IID activities across BRICS innovation ecosystems, capabilities, learning and measurement of innovation, and why? What (if any) changes occur in the role and functionality of THA that arises from the specifics of IID, how do these changes take place, and what shifts occur in the innovation system, e.g. in blending formal and informal sectors or actors? What IID-relevant public policies and policy support for IID are available in BRICS countries and what roles do (or can) THA play in operationalizing these policies? Are these policies needed and if yes, why? How do they support / promote IID and what are the challenges and limitations and how can these be mitigated or managed?

The extensive literature review in this paper resulted in the identification of roles played by THA in IID. The examination suggests that empirical data needed to effectively map IID activities and policy support in BRICS, and thereby address the research questions posed in this paper are, presently, insufficient, weak or non-existent. Further research, therefore, could focus on the generation and dissemination of empirical data on IID. This research also highlights new possibilities related to changing public (including science, technology and innovation) policies, triple helix (TH) and the national systems of innovation (NSI) frameworks with a view to further research that examines the possibilities of extending public policies and existing frameworks to ensure that they provide for IID.

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Notes

1. Used here in line with the ILO definition, it refers to economic activities by workers and economic units that are –

in law or in practice – not covered or insufficiently covered by formal arrangements. This means that they are operating outside the formal reach of the law; or although they are operating within the formal reach of the law, the law is not applied or not enforced; or the law discourages compliance because it is inappropriate, burdensome, or imposes excessive costs. (Accessed 4 July 2016, <http://libguides.ilo.org/informal-economy-en>)

2. For instance, although recent data indicate that poverty levels in South Africa have dropped since 2002 and 2006, reaching a low of 45.5% in 2011 (SSA 2014), this remains a high figure.
3. We acknowledge that there are various forms of inequality, such as, income, wage, earnings, urban, spatial and social inequality. Nevertheless, we do not address these distinctions as they are beyond the scope of this paper.
4. Such as in Russia, where inclusive innovation or innovation for inclusive development still does not feature in the mainstream literature or public policies.
5. Defined in terms of innovation from/for/at/by grassroots, based on Daniels (forthcoming) framework.
6. The epistemological roots of 'inclusive innovation' concepts in India can be traced to the Gandhian model of agricultural technologies development.
7. In addition to the specific roles of each actor in the different countries.
8. An example of which is the Mission-Oriented Finance for Innovation Conference (<http://missionorientedfinance.com/>) co-financed by BNDES in partnership with SPRU, hosted in London, UK, and the subsequent book (<http://www.policy-network.net/publications/4860/Mission-Oriented-Finance-for-Innovation>) edited by Mariana Mazzucato and Caetano C. R. Penna.

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