



Overview of Inclusive Business Approaches: Addressing Challenges Facing Poor and Vulnerable Communities

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Question

What is the evidence that inclusive business approaches (e.g. stakeholder partnerships, investing directly, risk financing, sharing risk) aimed at scaling innovative products, services, and business models that address specific challenges facing poor and vulnerable communities have achieved expected impacts?

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The K4D helpdesk service provides brief summaries of current research, evidence, and lessons learned. Helpdesk reports are not rigorous or systematic reviews; they are intended to provide an introduction to the most important evidence related to a research question. They draw on a rapid desk-based review of published literature and consultation with subject specialists.

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1. Overview

Inclusive innovation programmes are initiatives that assist the welfare of lower-income groups – such as poor and excluded groups (OECD, 2015a). Similarly, Mashelkar (2014) notes that inclusive innovation is any innovation that leads to inexpensive access of quality goods and services generating livelihood opportunities for the excluded population on a long-term sustainable basis with a considerable outreach.

Innovation policies targeted at tackling industrial and territorial inclusiveness can also boost inclusive growth since they shape the opportunities of individuals in different firms, industries and regions to participate in innovation. To deal with industrial inclusiveness difficulties, innovation policies may focus on addressing the main obstacles to entrepreneurship faced by disadvantaged groups, such as obstacles to access finance (e.g. via micro-credit and equity financing), talent (e.g. through grants to SMEs to recruit researchers or experts to apply innovation projects) or other support services (e.g. with business counselling, support to access new markets, etc.) (OECD, 2017b).

The available (limited) evidence on inclusive innovation cautions that few of the inclusive innovation projects reach the necessary scale. For instance, after surveying well over 400 inclusive businesses, Kubzansky, Cooper and Barbari (2011) were able to find that only 37% of them were commercially feasible and had the likelihood to attain scale. Further, they note that only 13% were functioning at scale. Nonetheless, the failure rates for inclusive innovations are not that high when compared to standard innovators (OECD, 2017a).

There is a growing list of inclusive innovation projects in different emerging countries in different parts of the world (see section 3 and 4, as well as the resources provided under ‘key websites’ section – at the end of the report). Despite this trend, however, this rapid literature detected a **lack of good programme reviews and evaluations**. This is also attested by other studies and reports (e.g. Foster and Heeks, 2013; Ciarli et al., 2018; Paunov, 2013). Conducting intermediate or final programme reviews and making such reports publicly available would be helpful for better learning among policy makers, the development community as well as the Science and Technology (S&T) community. The academic community and the research departments of major development institutions may fill an important gap by further exploring the issue.

This rapid evidence review looks at reports issued by different development agencies, government bureaus and some academic publications – regarding inclusive innovation policies that target poor and vulnerable groups across emerging countries as well as within specific regions/sectors of a country. Some of the key findings gathered from different inclusive innovation policies from emerging countries have been summarized below:

- In Chile, the Prototypes of Social Innovation programme has been launched to assist vulnerable communities and regions through the adoption of innovative solutions.
 - It supplies financing to develop new solutions (or their concepts).
 - It particularly targets solutions with bigger impacts.
 - Local communities take active part in identifying local challenges.
 - Lack of adequate information on programme has hampered implementation.
 - Some scaled up solutions were not ‘sufficient’ to deal with important challenges.

- The National Action Plan for Scientific Literacy programme in China has been working to enhance innovation through advancing scientific literacy especially among poor/disadvantaged groups and lagging areas of the country.
 - It supports science education and innovation in poorer areas/communities (e.g. via 'National Science and Technology Week' and 'Science and Technology Museums').
 - It provides professional business counselling or advice to entrepreneurs to tackle barriers to entrepreneurship faced by disadvantaged groups.
 - Innovative SMEs receive both financial and professional advisory support.
- The Ideas for Change Programme in Colombia has sought to find innovative solutions to different problems faced by poor and vulnerable local communities, especially in the energy and environment sector.
 - Businesses and projects that tackle local challenges by employing science, technology and innovative solutions receive financial support.
 - It employed a participatory virtual platform where vulnerable communities themselves identify their needs and challenges.
- The Productive Territories Programme in Mexico targets assists the creation or scaling up of business opportunities for poor rural households and enhancement of their productive capacities.
 - The target community is engaged in the design and implementation of the programme.
 - Programme instruments are customized by location, target groups, needs and available assets.
- Further, the Thuthuka programme in South Africa aims to boost inclusive social innovation by funding researchers from vulnerable groups.
- The Spark Programme and Envoy System in China support the development and scaling up of social innovation and entrepreneurship that will be beneficial to rural/farming populations. It facilitates technology transfer to deal with barriers to entrepreneurship.
- The Royalties for Science, Technology and Innovation programme in Colombia works to boost innovation and competitiveness in regions of the country with weak innovation. It accepts innovative projects/proposals involving companies, research centres and regional governments.
- The Science and Technology Entrepreneurship Development programme in India promotes inclusive social innovation through financial support to microenterprises in poorer regions of the country.
- The Special Economic Zones programme in Mexico promotes inclusive innovation in the poorer southern regions of the country through fiscal incentives, trade facilitation and infrastructure development to benefit target firms and their competitiveness.

This brief report is structured as follows. Section 2 discusses the (economic and social) importance of inclusive business approaches. Section 3 looks at country case studies showcasing interventions targeting inclusive innovation – specifically focusing on social inclusiveness. Section 4 provides evidence that focuses on inclusive innovation interventions that have a geographical focus (i.e. locations within a country where the poor and vulnerable might be concentrated).

2. Importance of Inclusive Business Approaches

Innovation policies are key to sustainable growth plans of most emerging economies. However, they have not received much attention in government strategies to foster social inclusion. In recent years, many of these countries have implemented ‘inclusive innovation policies’– i.e. a particular set of innovation policies that try to enhance the capacities and opportunities of disadvantaged individuals or groups to participate in innovation activities (including research and entrepreneurship). Examples include the allocation of grants to researchers from underprivileged groups, the implementation of programmes to promote science and technology, the delivery of micro-credit to entrepreneurs and the provision of grants to firms that are locating their Research and Development (R&D) activities in peripheral or deprived regions (OECD, 2017a; OECD, 2015a).

Inclusive innovation policies try to remove barriers to the participation of specific individuals, social groups, firms, sectors and regions that are currently underrepresented in innovation activities so as to guarantee that all segments of society have the capacities and opportunities to effectively participate in and benefit from innovation. Based on case studies on inclusive innovation policies from several countries (comprising of both emerging and developed countries), OECD (2017b) show that a wide range of inclusive innovation policy approaches can foster inclusive growth.¹ Examples of instruments used include research grants, innovation vouchers and entrepreneurship education programmes, among others. Other policy instruments that address social inclusiveness include, for instance, the provision of grants to researchers from disadvantaged groups, the use of role models and mentoring schemes to deal with stereotypes, and the introduction of programmes to popularise science and technology (OECD, 2015a; 2014b).

While the reasons for employing inclusive innovation policies differ, one key goal is to deal with the misallocation of resources (which is disadvantageous to vulnerable groups and their businesses) because of inequality and exclusion (OECD, 2017a; OECD, 2016c; Essers, Megersa and Sanfilippo, 2019; Pagés, 2010). Rectifying misallocation is important, both for economic growth and for job creation. Social inclusiveness policies especially tackle discrimination in labour markets by showing the potential of certain social groups and changing the attitudes of employers and investors towards them. They also promote social mobility and inclusion by integrating underprivileged groups in more productive activities of the economy. Industrial inclusiveness policies are employed to address the problem of a ‘dual economy’ (i.e. an economy divided into highly productive/innovative sectors and traditional/low-productivity sectors) by enhancing the competitiveness of less innovative firms and encouraging the rise of new activities through entrepreneurship of underrepresented groups. New activities may fulfil previously underserved needs. Territorial inclusiveness policies encourage the development of more productive and innovative activities in lagging regions, presenting better opportunities for people in those areas. They also improve the chances of other initiatives (such as investment in R&D and transport infrastructure) to have their planned effects on innovation performance and growth (OECD, 2017a; OECD, 2017b).

¹ The list of countries looked at by OECD (2017b) includes Chile, China, Colombia, Germany, Hungary, India, Ireland, Israel, Japan, Korea, Lithuania, Mexico, New Zealand, South Africa and the United States.

Nonetheless, inclusive innovation policies (despite their great societal and economic value) may be difficult to successfully implement. For example, by focusing on disadvantaged groups and laggard industries and regions, inclusive innovations are usually faced with several specific implementation challenges that apply less to other innovation policies (see examples in Sections 3 and 4 below). These, for instance, include the low participation of the target group in policy programmes due to low awareness about their presence or low confidence in governmental programmes; and low capabilities among target groups to carry out activities endorsed by the intervention. As a result, the success of inclusive innovation policies depends on the greater involvement of target groups (e.g. through new digital tools) and usually necessitate greater capacity-building/funding endeavours.

3. Case Studies: Interventions Focused on Social Inclusiveness

3.1 Chile: Prototypes of Social Innovation programme (2014-Present)

Programme Description

The programme aims to develop proofs of concept and prototypes of innovative solutions to meet social/regional challenges through open innovation. It particularly targets regions and communities facing specific social challenges. The programme supposes that innovation and new technologies offer opportunities to solve social challenges of the country – but those with the capacity to develop solutions often do not know the specific challenges communities face. The programme was also launched in part since Chile continues to struggle with a fragmented innovation system. Moreover, Chile displays persistent limited social mobility and high inequality, preventing lower-income individuals and communities in lagging regions from participating in innovation activities (Domanski and Monge-Iriarte, 2019; Stanley et al., 2018; IPP Chile, 2017; OECD, 2017c).

Implementing Agencies & Budget

The Chilean Economic Development Agency (CORFO) of the Ministry of Economy and regional institutions (regional governments and public services) run the programme. The National Innovation and Development Council, the InterAmerican Development Bank (IDB) and the regional government were also involved in helping the pilot initiative in the region of Aysén. The budget for the pilot project in Chilean pesos is CLP 430 million (USD 1.1 million). During the pilot phase, 13 projects were selected for implementation (IPP Chile, 2017).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The programme provides financing to develop proofs of concept and prototypes of new solutions to meet major regional challenges. An open call for innovations is issued, encouraging individuals, companies, universities and others to innovate. It issues calls for innovative solutions to local difficulties on an online open innovation platform.

Candidates present their ideas on the platform, where they interact with mentors and local communities in order to develop and improve their ideas. Final proposals are submitted for funding and the best solutions are selected.

Innovation and scaling up: The innovative solution must, in addition to answering the specific social challenge and having potentially high social impact, be appropriate for intellectual property protection, and be potentially replicable, sustainable and suitable for scaling up. The chosen solutions receive a non-repayable grant covering up to 80% of the project development (up to USD 61,000), while applicants are responsible for the remaining percentage. Funding is given in two phases: the first one covers proof of concept and is limited to CLP 4 million (approximately USD 6,000), while the second supports the development of a prototype of the social innovation, including testing with the recipient community as well as a sustainable business model and a plan for scaling up (Domanski and Monge-Iriarte, 2019; OECD, 2016a; 2017b).

Challenges, Impacts & Lessons

IPP Chile (2017) noted the following challenges during implementation:

- the country's weak innovation culture (specifically, lack of awareness regarding the concept of social innovation) which led to difficulties in formulating projects;
- problems in defining metrics to track and evaluate social innovation;
- low co-ordination among the different institutions and actors involved in the different stages of the instrument;
- poor leadership capacity of regional actors, given the inadequate development of the regional innovation ecosystem.

The following actions were taken to address these challenges (IPP Chile, 2017):

- Regions were empowered to lead social innovations in a decentralised fashion by supplying them with further responsibilities during the implementation process. Furthermore, the authority to select solutions to social challenges is being transferred to regional committees.
- CORFO worked to increase the coherence of the different processes involved in the instrument. It also dedicated efforts to defining indicators for processes and intermediary outputs and is evaluating whether a single institution can act as a facilitator through the different stages of the instrument.
- CORFO is developing partnerships with other institutions (with close links to local communities) in the interest of improving workshop participation.

The first stage of the project (pilot programme in the region of Aysén) concluded in October 2015 with the selection of 13 proposals. The evaluation of this phase revealed that the programme received 40 proposals, with 25 from the region of Aysén. Eighteen proposals related to the youth challenge (11 proposals from the region of Aysén) and 22 related to the environment challenge (14 proposals from the region of Aysén). The proposals encompassed product and service innovations, process innovations and organisational innovation. Proposals for the youth challenge targeted various factors, including the creation of job and entrepreneurship opportunities, meeting spaces and recreational activities, capacities and technology generation, and health. Proposals for the environment challenge focused on technologies for reducing pollution, energy efficiency and reusing resources. Some proposals aimed to address both challenges conjointly by developing regional tourism potential together with the involvement and

leadership of young citizens. A wider evaluation process seeks to pave the way for the replication of the programme across the other regions of Chile (IPP Chile, 2017).

While discussing about the overview of programme and some of its challenges, Domanski and Monge-Iriarte (2019) argue that common solutions have not been adequate to meet the major challenges of the target society. Furthermore, they note, academic knowledge on social innovation in Chile is still very scarce.

Domanski and Monge-Iriarte (2019) also note that the programme for Social Innovation has been created and improved based on different sources of feedback. It has proved its importance not only to funding and supporting initiatives, but also to creating and shoring up social innovation ecosystems in order to develop new social practices. Equally, the creation of new activities (through social innovation) may serve the needs of more disadvantaged or excluded groups, or geographical areas that were previously underserved, thus improving the well-being of these populations (OECD, 2015a). Having several economic activities can advance the resilience to negative shocks in demand that may affect specific sectors. The more diversified the economy, the higher are the chances for risk diversification.

3.2 China: National Action Plan for Scientific Literacy (2006-2020)

Programme Description

The programme plans to enhance scientific literacy, with the objective of providing adult citizens with basic scientific literacy by 2050. The programme was launched because scientific literacy among the general population (particularly among the poor in lagging areas) was low. This hindered economic development and innovation performance. It focuses on targeting disadvantaged populations from underdeveloped regions of China (IPP China, 2017a; OECD, 2017a; 2017b).

Implementing Agencies & Budget

The main implementing agencies are the Ministry of Education (MOE) Ministry of Science and Technology (MOST) Association of Science and Technology. In 2012, total funding was CNY 12.288 billion (USD 3.5 billion) of which the government provided CNY 8.504 billion (USD 2.4 billion). In 2013, total funding was CNY 13.219 billion (USD 3.7 billion) of which the government supplied CNY 9.225 billion (USD 2.6 billion) (IPP China, 2017a).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The programme supports in the financing of public education – particularly targeting scientific activities (e.g. National Science and Technology (S&T) Week) and education infrastructure (e.g. S&T Museums in lagging areas and communities). A more longer-term policy instrument/objective that can help integrate disadvantaged groups in innovation activities is to strengthen their scientific literacy. In this regard, the programme invests in compulsory scientific education and in public education infrastructure, with the long-term goal that all Chinese adult citizens achieve a basic level of scientific literacy by 2025. To achieve this goal, it is crucial to guarantee that all segments of society have equal access to quality education (IPP China, 2017a; OECD, 2017b).

Innovation and scaling up: In relation to instruments to address barriers to entrepreneurship and innovation faced by disadvantaged groups (i.e. provision of business development support), the programme offers professional business counselling or advice to entrepreneurs. This is frequently part of broader support schemes, and a condition for receiving financial support. It provides both financial and professional advisory support for SMEs that aim at engaging in or scaling up innovative activities (OECD, 2017b).

Challenges, Impacts & Lessons

According to IPP China (2017a), Key challenges included:

- Science popularisation and education largely rely on government investment, while investments from the business sector and social organisations are rather minimal. Higher levels of investment from the private sector are required to fully achieve the plan's targets.
- Significant gaps remain in education levels between developed and underdeveloped areas. Achieving the objectives of the plan in lagging areas is particularly challenging.

The Actions undertaken to address programme challenges include (IPP China, 2017a):

- Enterprises and social organisations are supported to participate in activities for science popularisation, for instance, through government procurement and tax allowances.
- Financing from central government has grown to support underdeveloped areas.

The programme has improved S&T primary education and raised awareness about their benefits in people's lives. It has supplied information about the benefits of S&T, research and innovation. The programme also tries to ensure the involvement of the target group in policy programmes (IPP China, 2017a; 2017b).

A brief evaluation of the outcomes of the scheme (IPP China, 2017a) showed that scientific literacy has risen substantially over recent years. The rate of basic scientific literacy reached 6.20% in 2015, compared with 3.27% in 2012 and 1.60% in 2005. According to available statistics, 129 science and technology museums were operational across China by the end of 2014, as well as 134 mobile science and technology museums and a fleet of 865 Science Wagons. They achieved a combined total of over 75 million visits. The number of popular science education bases at the provincial level or above has reached 3,885 with annual attendance recording roughly 280 million visits.

3.3 Colombia: Ideas for Change (IFC) Programme (2012-15)

Programme Description

The IFC programme was launched to assist various communities living in conditions of extreme poverty and vulnerability in Colombia. It tried to find solutions to challenges faced by poor and vulnerable local communities with unmet needs, **particularly relating to the environment and energy fields** (OECD, 2017b; IDB, 2019; IDB, 2016; Ideas para El Cambio, 2019; UNFCCC, 2017).

Implementing Agencies & Budget

The main implementing agency was *Colciencias* (Administrative Department for Science Technology and Innovation). The budget was COP 948.6 million (USD 754,200) in 2015 (IPP Colombia, 2017a).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The programme delivered financial support to projects that use science, technology and innovative solutions to address local challenges – as an instrument to enhance innovation in lagging regions. The programme delivered grants which are provided to firms, universities and research institutions that can solve identified local challenges in the environment and energy fields. Such challenges were previously identified in consultation with local communities.

Innovation and scaling up: It allowed vulnerable communities to self-identify their specific needs and difficulties through a virtual platform. Based on identified problems, the Science, Technology and Innovation (STI) community (i.e. individual researchers, firms, universities and research institutions) proposed specific solutions to specific problems, which were creative and involved low-cost technologies. Grants were provided to implement or scale up selected solutions (OECD, 2017a; 2017b; 2017c).

Challenges, Impacts & Lessons

According to IPP Colombia (2017a), the main challenge to programme was obstacles in mobilising actors from academia, government and society to devise specific solutions to social problems using STI.

- Usually, such collaborative relationships are vertical. Nonetheless, this programme required a more symmetrical relationships – which at times led to obstacles in the various interest groups to building inclusive and collaborative processes.
- The ways in which actors are involved greatly affects the success of the inclusive innovation process necessary to generate new knowledge or develop new technologies. Inclusive practices not only solve social problems but can also generate new dynamics of knowledge articulation. This could add value to social innovation and policies scaled around STI that boost trust, associative environments and social cohesion.

To deal with some of the key challenges *Colciencias* executed the National Strategy for Social Appropriation of STI, structured along four lines of action - namely: citizen participation in STI; supporting the science communication process; promoting stakeholder dialogue around knowledge sharing; and managing knowledge about processes for the social appropriation of STI. Further, *Colciencias* and the National Planning Department (*Departamento Nacional de Planeación*, DNP) directed the design of a National Strategy on STI for 2016-2025 (IPP Colombia, 2017a).

The programme concentrated on the departments (sub-national regions) of La Guajira, Risaralda and Putumayo. Based on the needs expressed by the poor and vulnerable communities that inhabit these departments and lack access to drinking water, the scientific and innovative community proposed 59 solutions in 2012. *Colciencias* picked 11 of the most innovative with the

highest potential to respond to community needs. In the same year, these 11 projects received funding of COP 948.6 million (USD 754 200), distributed across the departments of La Guajira, Putumayo and Risaralda. Implementation of these solutions helped roughly 500 families directly. Scaling up of these solutions was planned for other communities with similar problems, to enable more people to participate and benefit from this round of the programme (IPP Colombia, 2017a).

The second edition (year 2013) of the programme focused on clean and renewable energy. The first phase targeted communities living in non-interconnected areas of the departments of Chocó, Valle, Cauca and Nariño. There were 117 submitted needs of which Colciencias spotlighted the most pressing 20 in 2013. These needs were the most appropriate for STI solutions with the potential to enhance the quality of life in these departments. Prioritised proposals were characterised by the use of clean, low-cost and renewable innovative energy sources. An additional criterion was the use of methodologies beneficial to active involvement of the affected community, to ensure the solution is suitable and sustainable over time. In 2013, “Ideas for Change” received an e-governance excellence award from the Organisation of American States. It recognised its efforts to improve the provision of services with the collaboration of third parties through open innovation (IPP Colombia, 2017a).

Some communities in more remote areas were initially hesitant to have the government and the research community provide solutions to their needs, due to the lack of trust.

Often the target groups of inclusive innovation policies might also have had little previous contact with governmental programmes or feel an antipathy to the prospect of long bureaucratic application processes. Thus, they might not trust governmental intervention or might not perceive the potential benefits from it, leading to low levels of engagement to the programme and/or opposition to its implementation (OECD, 2017a).

3.4 Mexico: Productive Territories Programme (2015-2018, Pilot phase)

Programme Description

The programme has been launched to deal with the rural poverty in Mexico – which is severe due to a lack of productive businesses and corresponding employment opportunities. The aim is to reduce poverty and boost productivity of rural households in Mexico, by developing community-level plans to support economically relevant business opportunities for poor rural households, enhance their productive capacities, and ensure their effective access to and use of public programmes for which they qualify. The programme targets poor rural households (IPP Mexico, 2017a; OECD, 2017b; FAO, 2014).

Implementing Agencies & Budget

The main implementing agency was *Secretaría de Desarrollo Social*. The three-year budget (for 2015-2017 period) was about MXN 229 million (USD 27.6 million). Further, the annual budget was MXN 103 million in 2015 (USD 12.5 million) and MXN 63 million in 2016 (USD 7.6 million). Recipients included 9,500 participants in 1,300 projects at different stages of development (IPP Mexico, 2017a).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: As a programme instrument, technical teams developed tailored development plans for each location, considering existing assets and local needs. The community is involved in the elaboration and validation of such plans. The technical team also seeks access to the different federal support programmes and implements the programme. Thus, the programme has engaged the target group in the design and implementation of the programme (IPP Mexico, 2017a; OECD, 2017b; OECD, 2016a).

Innovation and scaling up: So as to connect the programme beneficiaries to the marketplace, their projects have to include an innovation component (that is, a change in practice or technology) (IPP Mexico, 2017a).

Challenges, Impacts & Lessons

Subsequent to the initial year of implementation, the following key challenges were identified (IPP Mexico, 2017a):

- The poor have constrained productive capacity, which can result in unprofitable projects. Some of the Productive Programmes have found it challenging to support some of the projects presented.
- The programme faced difficulties in enticing technical advisors with the required skills. Because the target populations are in areas far from large cities, there are fewer local people with the appropriate training to co-ordinate or advise such projects. This can compromise the results of the projects. Besides, there has been a high turnover in technical advisors, which can create problems for programme implementation.
- In order to link the programme beneficiaries to the marketplace, their projects must include an innovation component (i.e. a change in practice or technology). Nevertheless, many projects lack this component and may have only limited long-term impacts.
- The implementation of multiple concurrent innovations can result in complications and hinder acceptance by the target population.

To tackle the above challenges, the programme carried out the following measures (IPP Mexico, 2017a):

- The programme launched changes in the selection process for technical advisors, to increase awareness of the work conditions in the target areas. This action was taken to tackle high turnover and difficulties in attracting technical advisors willing to work in remote regions.
- Efforts are ongoing to design guidelines for technical advisors regarding the inclusion of innovation-related components in project development.

While briefly examining the evaluation and outcomes of the scheme, IPP Mexico (2017a) noted that the programme has undergone several monitoring and evaluation procedures. During the first year, **a local evaluation based on operational results resulted in adjustments to the operational model to integrate new operational indicators and re-align procedures.** According to IPP Mexico (2017a) the National Council for the Evaluation of Social Development Policy of Mexico has also performed an evaluation of the programme (although this document was not identified/consulted while writing this report).

3.5 South Africa: Thuthuka programme (2001-present)

Programme Description

The programme supports researchers from disadvantaged groups – since they are underrepresented in terms of the positions that they hold and in accessing funding in the national research sector. The scheme intends to develop human capital and improve the research capacities of researchers from underrepresented groups (Thuthuka, 2019; Jager, 2014; SAICA, 2016; Barac, 2015).

Implementing Agencies & Budget

The key implementing agencies included the National Research Foundation (NRF) – which reports to the Minister of Science and Technology through its Board. Further, the Department of Science and Technology (DST) is the line department. There were 205 grant recipients in 2013-2014 (up from 130 in 2010/2011) with an average individual grant of ZAR 152 997 (USD 28 400) (33% increase since 2010/2011). The budget was ZAR 45,939,976 for fiscal year 2013/2014 (about USD 8.5 million). The budget of Thuthuka Research Grant has grown considerably since 2010 (year-on-year rises were 60%, 99% and 88% for the financial years 2011/2012, 2012/2013 and 2013/2014, respectively) (IPP South Africa, 2017).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The programme offers grants for research projects proposed by researchers from disadvantaged groups. It specifically targets projects by black people and women at different stages of their careers. Applications are evaluated using several criteria, including quality, scientific contribution and potential for human capital development. Funding is granted for three years, conditional on satisfactory annual progress reports.

Innovation and scaling up: Thuthuka has pioneered an innovative funding model that is renowned for the skills development and transformation it has brought especially to the accounting sector. It has been noted that Thuthuka's success in the sector will be further scaled up – where it will be used as a model to benefit other scarce-skills professions that are crucial for the South African economy – e.g. engineering, actuarial science, medicine and pharmaceuticals, etc. The programme has focused on funding focused on employability of trainees/students, so that they can be absorbed into the labour market and become active participants in the economy (SAICA, 2016).

Challenges, Impacts & Lessons

A review by NRF (2014) that compared the achievements of the programme with the stated targets for the period 2011-2014 highlighted several challenges which reduced the effectiveness of the programme. These include:

- The programme did not draw sufficient applications from black researchers, which rendered the race target almost impossible to meet. In addition, black applicants were significantly less likely to survive the peer review phase of the review process.
- Around 16% of overruled applications during the initial screening process were due to the applicant's employment contract.

- Thuthuka's funding pattern was biased towards urban areas of the country, along with certain geographical areas (the provinces of Gauteng and the Western Cape). This is because of the high concentration of research-intensive universities in these provinces.
- About 80% of the grants' value was utilized for grant-holder-linked capital development, leaving less than 20% for actual research activities, thereby undercutting the programme's efficiency as a source of research grants.

Measures that were taken to advance the programme's effectiveness included opening applications to non-permanent employees (16% of applications were declined based on this criterion), designing a marketing campaign targeting specifically black researchers, and offering application support to boost participation from disadvantaged institutions (IPP South Africa, 2017).

A report by NRF (2014) assessed results relating to gender and race targets for the 2009-2014 period. It analysed applications received, selected candidates and reasons for rejected applications. The report aimed to identify relevant interventions that the NRF could introduce to effectively and sustainably increase the participation rates of researchers from disadvantaged groups. Accordingly, results show that the programme reached its gender target for female grant recipients (60%) every fiscal year between 2010/2011 and 2013/2014, though the race target for black grant holders (80%) was not met. The share of black recipients varied from a maximum of 72% in 2010/2011 to a minimum of 44% in 2011/2012. A major factor is that the programme does not appeal to ample applications from black researchers. From 2011 to 2014, out of 1 518 applications for the Thuthuka Research Grant, 56% came from black researchers and 62% from female applicants. Black applicants also have a higher failure rate at the peer review stage, with only a 52% chance of passing this phase, while white applicants have a 73% success rate. The success of the gender target may be due to a high number of white female applicants. Overall participation of historically disadvantaged groups in public research is also monitored. Nevertheless, there are no evaluation measures in place to isolate the impacts of the Thuthuka programme from those of complementary programmes with similar aims. The Thuthuka programme, along with other policies, has added to the proportion of black NRF-rated researchers rising from 15% to 17% between 2008 and 2010, and the proportion of female NRF-rated researchers rising from 25% to 27% during the same time (IPP South Africa, 2017; NRF, 2014).

A study by Jager (2014) on the perceptions of factors influencing success (on students supported by Thuthuka) showed that **Thuthuka students believed that support was the main factor contributing to their success**, followed by individual commitment.

Despite its recruitment challenges, Thuka's secondary education outreach was estimated at over 1 million learners since its launch (Thuka, 2019; SAICA, 2016). Further, the various vulnerable groups supported include over 14,000 Orphaned learners (Thuka, 2019).

4. Case Studies: Location Focused Inclusiveness Interventions

4.1 China: Envoy System (2002-present)

Programme Description

The program allows for more innovation among rural populations by dispatching S&T specialists to the countryside and promoting innovative entrepreneurship in the rural areas. The programme is relevant because in rural areas of China, agriculture often depends on outdated technology, and does not have the expertise to use modern techniques. This hampers productivity and welfare improvements. The scheme particularly targets farmers in rural areas (IFAD, 2016; OECD, 2016a; 2017b).

Implementing Agencies & Budget

Key implementing agencies were Ministry of Science and Technology and Ministry of Human Resources (later Ministry of Human Resources and Social Security (MOHRSS)). The exact budget is unknown (IPP China, 2017b).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: As a key programme instrument, qualified S&T specialists provide farmers with S&T services, including demonstrations of new technologies, training and personalised consulting. Further, as a specific instrument to address barriers to entrepreneurship faced by disadvantaged groups, the programme finances technology transfer assistance (i.e. provision of business development support) (OECD, 2017b).

Innovation and scaling up: It particularly promotes the adoption and scaling up of innovative/advanced technologies in agriculture, by providing technology demonstrations and technology training by experts, among other support services. More recently, S&T envoys' tasks switched from agricultural technology services to helping farmers set up as S&T entrepreneurs (OECD, 2017b).

Challenges, Impacts & Lessons

According to IPP China (2017b), the key challenges to the programme's effectiveness were highlighted to be the following:

- Changes to plantation and breeding structures and broadening of the scope of business operations have resulted in increasingly diverse and complex demands for technology development in rural areas. Such demands require superior skills and knowledge on the part of S&T envoys.
- The structure of the envoy system is still relatively loose. A statutory framework more appropriate to long-term tasks needs to be created.
- Shortage of adequate funding results in an absence of stable project support.

- The service platform must be enhanced to ensure a better environment for the S&T envoys.

There was no good information on actions taken to address the above listed challenges (IPP China, 2017b)

Up to September 2013, more than 700,000 S&T envoys in agricultural areas operated with 38,000 enterprises or institutes, over 50,000 common interest communities, and more than 15,000 enterprises including 4 700 leading enterprises. In general, the envoys implemented 45,000 Science and Technology development projects. Moreover, 35,000 associations and economic co-operative organisations were established with a total of 4,609,000 members. A group of 113 entrepreneurship chains was established at the national level, with the creation of 115 entrepreneurship bases and 81 entrepreneurship training bases. The envoy system also resulted in the importation of 61,000 new technologies and 68,000 new varieties of products, and the establishment of 9,373 training bases for Science and Technology envoys. There are now 8,124 information platforms on S&T entrepreneurship, 1,907 demonstration and communication platforms, and 16,000 Science and Technology envoy serving stations. More than 60 million farmers have seen their incomes rise through the adoption of Science and Technology (IPP China, 2017b).

Furthermore, the Science and Technology entrepreneurship service mechanism in rural areas has been designed to create a sustainable policy system that supports the entrepreneurship service for Science and Technology personnel. The system is based on the amalgamation of government-driven and market-driven incentives, shared interests and risks, and a combination of encouragement and restrictions. Science and Technology envoys in rural areas also organised the implementation of agricultural industrialisation projects. By focusing on regional strengths and competitive advantages, the envoy system nurtured a group of leading agricultural enterprises. Progress in the Science and Technology literacy of farmers also increased their capacity to profit from innovation. This made an active contribution to the development of overall labour quality in rural areas, boosting the ability of farmers to avoid poverty and increase their earnings through Science and Technology (IPP China, 2017b).

Inclusive innovation policies like the Envoy System in China (and also the Spark Programme in China discussed in the next subsection) have helped to tackle the problem of so-called 'dual economies' – contexts where innovative, technologically advanced and highly productive sectors or firms coexist with the traditional, low productive sectors or firms that benefit little from new technology and lag behind in their productivity (OECD, 2015b; OECD, 2016b). These economic structures reinforce social inequalities and may even threaten social stability, because those in the less productive sectors of the economy do not benefit from the advanced sectors. Inclusive innovation policies (such as the Envoys System) address this problem by enhancing the competitiveness of less innovative firms to help them avoid lagging further behind. However, the experience from China has shown that these **policies should support firms and sectors that have the potential to be economically profitable and innovative, and not those performing non-sustainable, declining or obsolete activities** (OECD, 2017b).

4.2 China: Spark Programme (1986-2015)

Programme Description

The programme is aimed at enhancing the innovation performance of the rural economy through science and technology and popularise science and technology in rural areas. This intervention is useful because in rural areas, agriculture often depends on outdated technology, and does not have the expertise to use modern techniques. This hampers productivity and welfare improvements. The main geographic target of this programme are rural areas (OECD, 2008; OECD, 2016a; Huang et al., 2015).

Implementing Agencies & Budget

The main responsible agency for implementation was Ministry of Science and Technology. The programme budget relied on a fixed fund of CNY 250 million per year (central fiscal investment) (about USD 70 million) and other (unfixed) funds from local government, private funding and bank loans (IPP China, 2017c).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The main instruments of the programme include provision of technology training to improve the skills of farmers and rural entrepreneurs; management training; support to projects that use science and innovative technology and know-how from research institutes to solve local technology programmes, including technical demonstrations, product design and development of quality control techniques (OECD, 2017b).

Innovation and scaling up: Interventions (e.g. science and technology trainings to entrepreneurs, farmers and households) are highly scaled up to reach large number of beneficiaries. For instance, the programme served more than 6m farmers in 2010 (ERAWATCH, 2011). It was also estimated that under the Spark Program, over 40 million rural households receive some form of training (World Bank, 2013).

Challenges, Impacts & Lessons

Huang et al. (2015) note that **there was programme fragmentation within the Spark system** and other inclusive innovation programmes (e.g. the Envoy System discussed above).² **Because these programmes were set up in different periods and were managed by several governmental agencies, they lacked coordination.** Limited public funds were spread too thin in the system. They note that the recent Chinese reform plan announced in January 2015 aimed to overcome the fragmentation of the system, by integrating the various funding programmes.

In 2012, the National Spark Programme introduced 1,473 projects, with a total of CNY 200 million in funding (about USD 56.7 million). There programme established 5,062 Spark training

² Huang et al. (2015) note that the first public R&D funding program was established in China during the period of 1981-1985. Along the years, Spark Program, the National Natural Science Foundation of China, the 863 Program, Torch Program, the 973 Program and some other 90 funding schemes were established.

bases and 3,180 Spark schools. Spark technology training invested CNY 4.279 billion (USD 1.2 billion, PPP) and trained 11.83 million people. The programme also delivered 21,800 teaching materials, printed 11.43 million publications and produced 16 000 distance-learning texts. In 2013, the National Spark Programme supported 3 454 brand-name projects. According to MOST, the Spark industrial belt encompassed an area of 624,900 km², 114,000 companies and a total labour force of 12.3 million (IPP china, 2017c).

The programme also displayed some financial innovation, e.g. using equity investment as an alternative to loans/grants when appropriate. Particularly, there was a support to enhance the innovation capacities of local SME by having equity investments (e.g. Innovation Fund) among its policy instruments (World Bank, 2013).

Overall, the Spark Programme investigated a new model for rural technology services, forming teams that participated in technology and services in rural areas. It fostered regional pillar industries to promote the economic development of counties. It helped to close the digital divide and advanced information dissemination processes in rural areas. It promoted economic development in poor areas to help farmers out of poverty, raised their awareness of S&T and improved their ability to use technology. However, due to ongoing reforms of the S&T system in China, the Spark Plan was cancelled in 2016. Other plans are anticipated (IPP china, 2017c).

4.3 Colombia: Royalties for Science, Technology and Innovation programme (2012-present)

Programme Description

This Royalties for Science, Technology and Innovation (RSTI) programme is relevant for Colombia because regional inequalities are sizeable – including in innovation performance. The scheme aims to increase the scientific, technological, innovation and competitiveness capacities of regions. It targets those regions with weak innovation performance (OECD, 2016a; OECD, 2017c; IPP Columbia, 2019).

Implementing Agencies & Budget

The main implementing agencies were the National Planning Department (DNP) and Colciencias (Administrative Department for Science Technology and Innovation). The programme funds inclusive innovation projects in 32 departmental (sub-national) governments and the capital city district (Bogotá). 264 projects have been financed with an average of COP 9.8 billion (about USD 3.1 million) per project. Between 2012 and 2015, the STI Fund received COP 3.23 billion (about USD 1.1 million). Between 2016 and 2024, about COP 0.7 billion (about USD 24 million) are expected to enter the fund per year. 264 projects are being financed for a total budget of COP 2.67 billion (about USD 849 million), of which COP 2.15 billion (about USD 684 million) are funds from royalties and COP 0.52 billion (about USD 165 million) are matching funds from multiple sources (national government, universities, private sector, etc.) (IPP Colombia, 2017b).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The key instrument adopted by the RSTI programme is provision of funds to support regional Science, Technology and Innovation (STI) activities that

contribute to the production, use and absorption of knowledge by industry and society. RSTI supports regional governments in their efforts to implement science, technology and innovation projects. In this regard, the scheme devotes 10% of the royalties obtained from the extraction of non-renewable natural resources to finance regional STI projects that generate long-term capacities in the region, conditional on being consistent with public policies at the national, territorial and sectorial levels. The instrument also encourages the articulation of actors of the Colombian innovation system by favouring proposals submitted by regional governments jointly with universities, science parks and companies (OECD, 2017a; 2017c).

RSTI also involved third parties (in addition to regional authorities) in the design of project proposals. The programme favours interregional proposals involving research organisations and other innovation actors from regions other than where the project is to be executed. This measure aims at enhancing the capacities of regional authorities in project design and ensuring that proposals meet the programme requirements (OECD, 2017b).

Innovation and scaling up: The programme supports the scaling up of innovative inclusive projects. As a result of this programme (and other related innovative and inclusive schemes such as the 'Ideas For Change' - discussed above), the World Economic Forum's report on a guide to scale up social innovation³ had chosen Colombia's Department for Social Prosperity as a good example of public sector institution underscoring its role in introducing concepts of social innovation at all policy levels (IDB, 2016).

Challenges, Impacts & Lessons

The RSTI programme has suffered from limited local expertise in building and deploying inclusive and STI-intensive projects. Progress was hampered by the lack of experience of regional authorities (outside the area of Bogota) in structuring proposals for STI-intensive projects, which had to be subsequently evaluated and accepted by the national government. This discouraged applications and led to low take-up of available funds (OECD, 2017b).

Despite the recruitment challenges, the programme has created teams of experts to aid on the ground to regional governments (i.e. to those with previous lack of experience in building STI-intensive projects). The teams help them structure proposals (which must be evaluated and accepted by the national government) and execute projects. The central government is also developing a portfolio of standardised projects to be promoted in regions with limited use of their share of STI royalty funds (OECD, 2017b).

As of January 2017 (when the report IPP Colombia, 2017b was published), 264 projects have been financed to a total of COP 2.67 billion (about USD 849 million), of which COP 2.15 billion (about USD 684 million) are funds from royalties and COP 0.52 billion (about USD 165 million) are matching funds from multiple sources (national government, universities, private sector, etc.). Moreover, about COP 310 billion (about USD 99 million) are being invested to support the PhD studies of more than 300 individuals and the Masters studies of more than 2,500 individuals, and about COP 290 billion (about USD 92 million) are being used to support educational activities related to STI for over 85,000 children and young people across the country. To complement

³ 'Breaking the Binary: Policy Guide to Scaling Social Innovation' World Economic Forum & Schwab Foundation for social entrepreneurship. April 2013.
http://www3.weforum.org/docs/WEF_Breaking_Binary_Policy_Guide_Scaling_Social_Innovation_2013_2604.pdf

these activities, over COP 600 billion (about USD 191 million) are assisting to fund projects in areas as diverse as health, biodiversity, hydrobiological resources, alternative energies and mining, among others (IPP Colombia, 2017b).

4.4 India: Science and Technology Entrepreneurship Development (STED) programme (1996/97–present)⁴

Programme Description

The main objective of the STED programme is to promote the development of lagging areas by supporting microenterprises. This programme is highly relevant for India because less developed regions of the country have large numbers of unemployed youth with the potential to launch microenterprises – but lacking the capabilities and opportunities to build such enterprises. STED mainly targets micro-entrepreneurs in lagging regions (OECD, 2016a; OECD, 2017b; Meyer, 2012; Manjunatha and Nagesha, 2012).

Implementing Agencies & Budget

Implementation is overseen by the National Science and Technology Entrepreneurship Development Board (NSTEDB) – under the guidance of the Department of Science and Technology (DST). Clear information on budget is not available (IPP India, 2017).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: STED's core instrument is provision of financial support to selected implementing agencies (educational or research institutions, government or nongovernment agencies with experience in promoting micro-entrepreneurship) for 4 years.

Innovation and scaling up: The implementing agencies analyse the region's potential and identify 3-4 technology areas of relevance. Potential entrepreneurs are then identified, trained and provided with support for scaling up (OECD, 2016a; OECD, 2017b).

Challenges, Impacts & Lessons

The programme has identified areas of specific relevance for different regions and trained potential local entrepreneurs in those sectors. The analysis of region's potential has been made by specialised agencies that receive governmental funds. Experience in this area has shown the importance of projects **focusing on communication and popularisation of science and technology**. For example, the National Council for Science and Technology Communication (NCSTC) in India implemented a range of initiatives to disseminate scientific knowledge, making use of mass and social media. One popular initiative is the Science Express, a mobile science exhibition mounted on a train travelling across India since 2007. For four years, it showcased ground-breaking discoveries and the latest innovations in the field of modern science by using exhibits, models and audio-visual displays. Since 2015, it has aimed at raising awareness among

⁴ Initially launched in 1985 and reformulated in 1996-97 (OECD, 2017b)

all groups of society as to how climate change can be combated through mitigation and adaptation (Department of Science and Technology, 2019).

STED has contributed to enhance the development of lagging regions by promoting self-employment in S&T sectors. While grants to implementing agencies are allocated for four years, yearly continuation of the project is contingent on satisfactory performance. Performance of projects is evaluated quantitatively and qualitatively by the STED Expert Advisory Committee, which meets two to three times a year at the project site to assess progress. A committee member and an officer from the National Science & Technology Entrepreneurship Development Board secretariat also regularly visit sites to monitor its evolution and suggest mid-term corrective actions if the targets are not being met. In extreme cases, the project may be terminated mid-term (OECD, 2017b).

Manjunatha and Nagesha (2012) note that **there are multifaceted efforts by the STED board to spread awareness (among S&T persons) about entrepreneurship.** The academics and researchers have started taking a keen interest in such socially and economically relevant roles and have engaged themselves in several ventures. More than 100 organizations, most of which are academic institutions and voluntary agencies, were drafted to the task of entrepreneurship development and employment generation in India.

4.5 Mexico: Special Economic Zones (SEZ) programme (2016-present)

Programme Description

The main objective of the SEZ programme in Mexico is to foster economic development in lagging regions in the south of Mexico, i.e. to address the gap between richer north and poorer south. Attracting foreign investment is expected to lead to job creation and increase production and trade revenues, improving the quality of life for people in those regions. SEZ is relevant for Mexico because there is an important gap between the north of the country (richer and more industrialised) and the south (with high poverty rates and an economy based mainly on agriculture). SEZ targets Mexico's peripheral regions (specifically three lagging regions in southern Mexico) (IPP Mexico, 2017b; OECD, 2017a).

Implementing Agencies & Budget

Main agencies in charge of implementation are the Ministry of Finance and Public Credit, Federal Authority for the Development of the Special Economic Zones and the Economic Productivity Unit. The programme targets four recipient zones - namely: the Inter-oceanic corridor on the Isthmus of Tehuantepec (in the states of Veracruz and Oaxaca); Puerto Lázaro Cárdenas (Michoacán and Guerrero); Puerto Chiapas (Chiapas); The Coatzacoalcos-Ciudad del Carmen Corridor (Campeche and Tabasco) (IPP Mexico, 2017b).

Instruments for Inclusiveness & Scaling Up Innovative Products

Investment/financing and partnerships: The main instrument of SEZ is the establishment of four special economic zones. The firms investing and creating jobs within the SEZs would benefit

from fiscal incentives; foreign trade facilities; streamlined regulations for doing business; special customs regulations; increased investment in competitive infrastructure; measures to increase regional productivity (e.g. training of workers) and to foster sustainable regional development (e.g. provision of social infrastructures) (IPP Mexico, 2017b; OECD, 2017a).

Innovation and scaling up: The program primarily intends to attract 'new' economic activities and industries/firms that are more innovative (e.g. complex/productive) and inclusive (e.g. in creating jobs) to the target regions (IPP Mexico, 2017b).

Challenges, Impacts & Lessons

Key challenges faced by the programme were (IPP Mexico, 2017b):

- Mexico's zones are located in areas with higher concentrations of poor people, with less education and training compared to the national average, and where current conditions are precarious - unlike other SEZs around the world. There is a risk that the population will not integrate with the new firms locating in the region and will thus remain excluded from economic progress.
- Firms setting up in the region will require goods and services, which could be supplied by local firms. However, if these firms bring their own suppliers, this would reduce the potential benefits of the SEZ for local firms.
- To guarantee sustainable economic growth, policy makers must design policies to attract firms that will build on existing assets and promote innovation in the region. Such policies should also avoid the attraction of unsustainable activities with low added value. An associated challenge is to attract firms that will establish research and development or engineering centres in the regions.
- Some of these regions are highly reliant on specific sectors (e.g. Coatzacoalcos and Salina Cruz rely heavily on the oil sector). It is crucial that regions avoid specialisation, as this could lead to economic collapse in the event of an economic shock to the sector in question.
- Southern Mexico hosts rich ecosystems that could be threatened by the development of infrastructure and certain economic activities, because of the establishment of SEZs.

To attract high-quality investments and talent, and achieve sustainable growth, complementary policies are being designed and implemented in these zones and their surrounding areas. These consist of policies to improve the human capital endowment through education, improve health services, expand financial services and develop public infrastructure including transport networks. To lessen unintended consequences on the environment, environmental impact assessments will be conducted on the development of infrastructure and new economic activities in the region (IPP Mexico, 2017).

A brief note on evaluation and outcomes of the scheme by IPP Mexico (2017b) states that **preliminary estimates indicate that the SEZs will attract around 500 enterprises to the regions and create more than 150 000 jobs within ten years of operation.** A more comprehensive evaluation was not identified at the time of writing this report.

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Key websites

- Business Innovation Facility – ‘Inclusive Business Boost’: <https://www.bifprogramme.org/inclusive-business-boost>
- OECD – ‘Innovation for Inclusive Growth’: <http://www.oecd.org/sti/inno/knowledge-and-innovation-for-inclusive-development.htm>
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About this report

This report is based on six days of desk-based research. The K4D research helpdesk provides rapid syntheses of a selection of recent relevant literature and international expert thinking in response to specific questions relating to international development. For any enquiries, contact helpdesk@k4d.info.

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