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Lessons from international
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INCLUSIVE INNOVATION POLICIES: LESSONS FROM INTERNATIONAL CASE STUDIES

Sandra Planes-Satorra and Caroline Paunov (OECD)

ABSTRACT

Innovation policies are central to growth agendas in most countries, but have figured much less prominently in strategies to promote social inclusion. In recent years, many countries have implemented “inclusive innovation policies”— a specific set of innovation policies that aim to boost the capacities and opportunities of disadvantaged individuals to engage in innovation activities, including research and entrepreneurship. Examples include the provision of grants to researchers from disadvantaged groups, the deployment of programmes to popularise science and technology, the provision of micro-credit to entrepreneurs and the provision of grants to firms locating their R&D activities in peripheral regions. This paper analyses the role that inclusive innovation policies can play in tackling social, industrial and territorial inclusiveness challenges by drawing on 33 detailed policy examples from 15 countries. The paper discusses why these policies should be a priority, explores the specific challenges that arise in their implementation and provides recommendations as to how the challenges can best be addressed.

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EXECUTIVE SUMMARY

Inequalities are one of today's most pressing challenges OECD countries face. Over the past three decades, income disparities have risen to unprecedented levels, with the richest 10% in the OECD area earning almost ten times more than the poorest 10% (OECD, 2015a). People who are economically disadvantaged often also fall behind in other non-income dimensions of well-being, including in terms of educational attainment and health status. Such inequalities not only significantly affect the well-being of the most vulnerable segments of the population, but also undermine countries' economic performance, as disadvantaged groups have fewer resources to invest in skills and education and therefore contribute less to than possible.

While innovation policies are central to growth agendas in most countries, they have figured little in strategies to promote social inclusion for inclusive policies. Other policy areas such as education, social and labour market policies, competition and tax policies have traditionally played a stronger role in fostering more inclusive societies. Yet these policies have not resulted in more inclusive growth in past decades. Could innovation policies be an alternative and complementary tool for inclusive growth? If so, how can innovation policies be effective?

The paper analyses inclusive innovation policies. These policies aim to remove barriers to the participation of individuals, social groups, firms, sectors and regions that are underrepresented in innovation activities in order to ensure that all segments of society have the capacities and opportunities to successfully participate in and benefit from innovation. The analysis is based on 33 detailed case studies of inclusive innovation policies from 15 countries (Chile, the People's Republic of China [hereafter "China"], Colombia, Germany, Hungary, India, Ireland, Israel, Japan, Korea, Lithuania, Mexico, New Zealand, South Africa and the United States) and two cross-country programmes.

Several conclusions emerge from the analysis. First, a wide range of inclusive innovation policy approaches can foster inclusive growth. Examples include research grant schemes, innovation vouchers and entrepreneurship education schemes, among others. Policy instruments that address social inclusiveness include, for example, the provision of grants to researchers from disadvantaged groups, the use of role models and mentoring programmes to tackle stereotypes, and the deployment of programmes to popularise science and technology.

Innovation policies aimed at addressing industrial and territorial inclusiveness can also support inclusive growth because they shape the opportunities individuals in different firms, industries and regions have to participate in innovation. To address industrial inclusiveness challenges, innovation policies may focus on addressing the main barriers to entrepreneurship encountered by disadvantaged groups, such as obstacles to access finance (e.g. through the provision of micro-credit and equity financing), talent (e.g. through grants to SMEs to recruit researchers or experts to implement innovation projects) or other support services (e.g. through the provision of business counselling, assistance to access new markets, etc.).

Policies to address territorial inclusiveness challenges may proceed by facilitating the access of firms and entrepreneurs in lagging regions to existing knowledge and technology (e.g. through technology demonstrations), maximising the potential of existing regional assets (e.g. by promoting the use of intellectual property protection in traditional sectors), and attracting innovative firms to

peripheral areas (e.g. through technology parks or the provision of grants to firms locating their R&D activities in peripheral regions).

Second, while rationales for implementing inclusive innovation policies vary, they all share a core goal which is to tackle the misallocation of resources in the economy due to inequality and exclusion. Correcting that misallocation is critical, both for economic growth and for job creation. Social inclusiveness policies in particular address discrimination in labour markets by demonstrating the potential of certain social groups and changing the attitudes of employers and investors towards them. They also foster social mobility and inclusion by integrating disadvantaged groups in more productive activities of the economy. Industrial inclusiveness policies are implemented to address the problem of a dual economy (i.e. one divided into highly innovative/productive sectors and traditional/low productivity sectors) by improving the competitiveness of less innovative firms and foster the emergence of new activities by increasing the entrepreneurship of underrepresented groups. These new activities may address previously underserved needs. Territorial inclusiveness policies foster the development of more productive and innovative activities in lagging regions, offering better opportunities for people in those areas. They also increase the chances of other initiatives (e.g. investment in R&D and transport infrastructure) to have their intended effects on innovation performance and growth.

Third, inclusive innovation policies, by focusing on disadvantaged groups and laggard industries and regions, are often confronted with a number of specific implementation challenges that apply less to other innovation policies. These include the low involvement of the target group in policy programmes, for example due to low awareness of their existence or low trust in governmental intervention; and low capabilities among the target group to undertake activities promoted by the programme. In consequence, the success of inclusive innovation policies relies on stronger involvement of target groups, including by using new digital tools, and often require strong capacity-building efforts matched to funding support.

INCLUSIVE INNOVATION POLICIES: LESSONS FROM INTERNATIONAL CASE STUDIES

Introduction

Innovation policies are central to growth agendas in most countries, but have figured much less prominently in strategies to promote social inclusion. Other policy areas such as education, social and labour market policies, competition and tax policies have traditionally played a stronger role in fostering more inclusive societies.

This paper argues that innovation policies can also play an important complementary role in promoting *inclusive growth*, which is “economic growth that creates opportunity for all segments of the population and distributes the dividends of increased prosperity, both in monetary and non-monetary terms, fairly across society”.¹ The focus is on *inclusive innovation policies* – policies that aim to remove barriers to the participation of individuals, social groups, firms, sectors and regions underrepresented in innovation activities. Their objective is to offer all segments of society equal opportunities to successfully participate in and benefit from innovation. Drawing on 33 detailed policy examples from 15 countries,² this paper discusses the role these policies can play in fostering inclusive growth. Emphasis is placed on identifying the challenges these policies need to address to be successful and solutions that have been identified, based on concrete policy examples.

Inclusive innovation policies are important additions to the policy toolkit against a background of widening inequalities in most OECD countries over the past decade even after tax and social benefits (OECD, 2015a; Paunov, 2013). In the current wave of skilled-biased technological change, opportunities arise for those having adequate capacities to participate in innovation, as new jobs require their skills and new entrepreneurial opportunities are emerging. In addition to these barriers, digitalisation is a source of scale economies and winner-take-all market structures. Such concentrated markets are a source of innovation-based rents, which are then redistributed to shareholders, senior managers and key staff, hence increasing the income share of the top income groups (Paunov and Guellec, 2017).

If successful, inclusive innovation policies allow disadvantaged and underrepresented groups to participate in the growth process. Inclusive innovation policies are complementary to other policy tools, particularly to education policies that ensure equal access to high-quality education, labour market policies that support opportunities for disadvantaged groups and good quality public services.

The paper is organised as follows. Section 1 discusses how the unequal distribution of capacities and opportunities to participate in innovation activities hampers inclusive growth. Section 2 analyses the role innovation policies can play in tackling social, industrial and territorial inclusiveness challenges, while Section 3 argues why such policies should be a priority in OECD countries. Section 4 looks at specific challenges that could arise during the implementation of these policies and how best to address them.

1. The distribution of innovation capacities and opportunities: effects on inclusiveness

Inequalities are one of today's most pressing challenges across OECD countries. Income disparities have risen to unprecedented levels in some countries over the past three decades, with the richest 10% in the OECD area earning almost ten times more than the poorest 10%. Wealth is even more concentrated than income: in 2012, the richest 10% controlled half of all total household wealth, while the poorest 40% held only 3% of the total across 18 OECD countries³ (OECD, 2015a). Increasing disparities have been driven both by the rise in income of population at the top of the income distribution (particularly at the top 1%) and by the decline at the bottom 40% (OECD, 2015b).

People who are economically disadvantaged often also fall behind in other non-income dimensions of well-being. They generally have lower educational attainment; are more likely to be unemployed or dissatisfied with their jobs; report worse health status; and are more affected by environmental degradation (OECD, 2016a). In addition, certain social groups are persistently underrepresented in the top of the income distribution. This suggests that economic disadvantage frequently intersects with certain social identity dimensions (such as gender, age, ethnic origin, place of residence or disability status) in ways that perpetuate inequality and social exclusion (World Bank, 2013a).

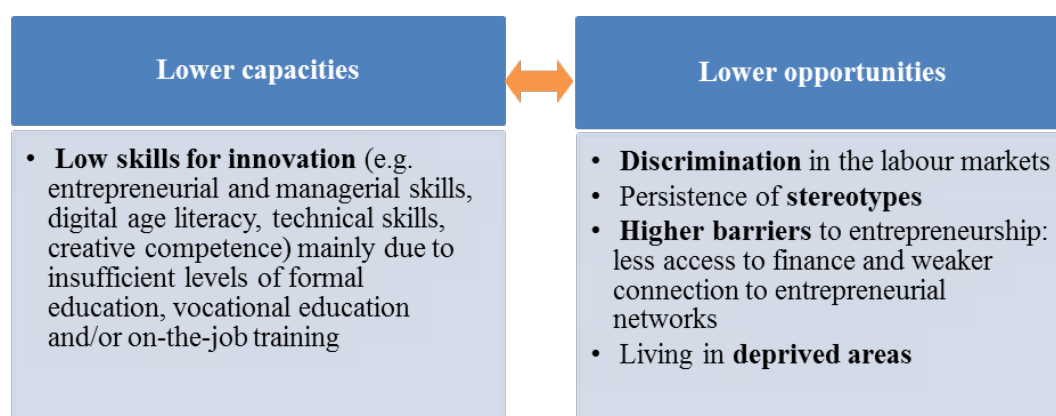
High levels of inequality not only significantly affect the well-being of the most vulnerable segments of the population, but also undermine countries' economic performance. As more disadvantaged segments of society have fewer resources to invest in skills and education, they have fewer opportunities to access more productive and rewarding jobs. Consequently, human resources in the economy are not used to the full potential, which negatively affects productivity growth in the long run. According to estimates for 19 OECD countries, the rise of income inequality between 1985 and 2005 would have knocked 4.7 percentage points off cumulative growth between 1990 and 2010 (OECD, 2015b). In addition, widening income gaps have a negative impact on social cohesion and diminish trust in institutions, which can contribute to social and political instability (Alesina and Perotti, 1996; Keefer and Knack, 2000).

In the current wave of skilled-biased technological change, opportunities arise for those having adequate capacities to participate in innovation, as new jobs require their skills and new entrepreneurial opportunities are emerging. Prospects for many others worsen: routine middle-skilled tasks are increasingly being automated, while jobs at the lower end of the skills distribution are seeing increased demand but are associated with low wages and low levels of job security. This growing polarisation in the labour markets may further exacerbate inequalities (Berger and Frey, 2016; OECD, 2011a).

Given these trends, measures to enhance the innovation capacities of disadvantaged groups and facilitate their access to innovation opportunities are crucial to foster inclusive growth. For purposes of this discussion, "social inclusiveness" is defined as the extent to which individuals in a country, independently of their socio-economic background, gender, age, ethnic origin, religion or place of residence, have the capacity and the opportunity to participate in innovation activities.⁴

1.1. Evidence and drivers of low social inclusiveness

Participation in innovation activities is not evenly distributed across social groups. Women, ethnic minorities, immigrants and residents in deprived areas, among others, are systematically underrepresented in research, innovation and entrepreneurship activities in most countries. For example, in Japan only 14.7% of total researchers in 2015 were women, and their share was even lower in the fields of science and engineering (Statistics Japan, 2016). In Israel, the Arab minority represented only 5.7% of total employment in the high-tech sector and 2% of employment in the R&D sector in 2015, while they accounted for 21% of the country's population (Innovation Israel, 2016). The low participation of those groups in innovation activities is frequently due to their lack of adequate capacities and/or their lower access to opportunities (Figure 1).

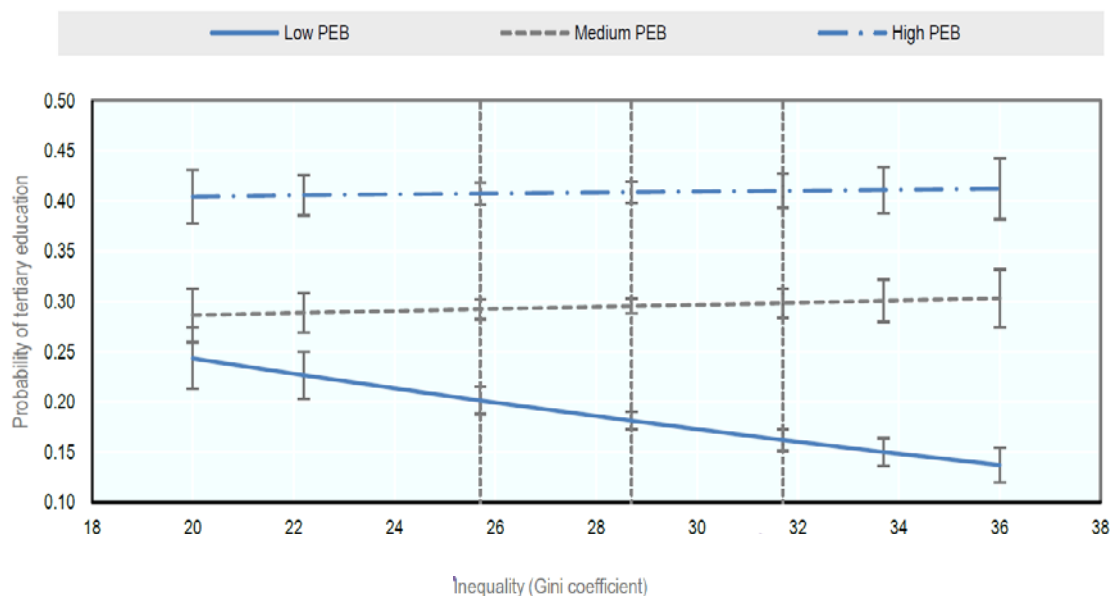
Figure 1. Causes of low participation of some groups in innovation activities

Capacities for innovation of disadvantaged and underrepresented groups

Most disadvantaged segments of the population frequently lack adequate capacities or skills for innovation. These are acquired through formal education, vocational education and on-the-job training, and include notably the ability for problem solving, critical and creative thinking, ability to learn and to manage complexity, ability for team working and communication, having initiative and motivation, being receptive to innovation, and leadership and entrepreneurial skills, among others (OECD, 2010a).

The relative importance of these skills depends on the characteristics of the innovative activity as well as the economic sector in which it takes place (Planes-Satorra, Moriguchi and Paunov, forthcoming). For example, solid scientific training, complex problem-solving ability and good communication skills are critical to engage in academic research or participate in R&D activities in high-technology sectors; vocational education and entrepreneurial skills might be relevant to adopt technologies or organisational methods created elsewhere to improve the productivity of small-sized enterprises (SMEs), or to expand the market outreach of start-ups through the use of new digital platforms.

One of the main factors influencing the capacity of individuals to participate in innovative activities is their level of educational attainment. Highly educated individuals are often more able to generate new ideas, and to recognise the value of knowledge created elsewhere and adapt it to new areas. They are also more flexible in adapting to and identifying new business opportunities arising through rapid technological change and shifts in consumer preferences. However, low-income families are often unable to afford to keep their children in education an optimal length of time, or to afford high-quality education. Even in countries where quality tertiary-level education is free, low-income groups may not be aware of the benefits of education, and/or may have low incentives to invest in it. This is particularly the case in societies with high levels of inequality, where the probability of tertiary educational attainment of children in lower-income groups is significantly lower than that of children in other income groups (Figure 2) (OECD, 2015b).

Figure 2. Probability of tertiary educational attainment by parents' educational background (PEB) and inequality

Notes: The figure shows the average predicted probability that individuals from poor, medium and high parental (educational) backgrounds attain tertiary education as a function of the degree of inequality (Gini points) in the country at the time they were around 14 years old. The level of education of parents (high, medium and low) is used in this figure as a proxy for socio-economic status. Low PEB: neither parent has attained upper secondary education; medium PEB: at least one parent has attained secondary and post-secondary, non-tertiary education; high PEB: at least one parent has attained tertiary education. The bars indicate 95% confidence intervals. The vertical dashed lines indicate the 25th, the median and the 75th percentiles of the underlying distribution of inequality.

Source: OECD, 2015b.

Entrepreneurship skills also increase the capacity of individuals to participate in innovation activities. These comprise the combination of technical skills, business management skills and personal skills required for starting up and operating in business and self-employment. They include, for example, opportunity recognition, team building, negotiation, strategy development, communication, decision making, risk management, financial planning, marketing and the ability to motivate and mentor. These may be developed through vocational education and training outside of formal education (including on-the-job training). Engaging in such training activities may be less costly than tertiary education, which increases the attractiveness for more disadvantaged groups.

Innovation opportunities for disadvantaged and underrepresented groups

Skills critically impact individuals' ability to participate fully in innovative activities. However, other factors might also limit the opportunities they have to do so, independently of their capacities. Obstacles may for example stem from:

- *Discrimination in the labour markets* – Some segments of society may be confronted with discrimination in the labour market on the grounds of gender, age, race, religion, ethnic origin or place of residence – and frequently a combination of those. Such discrimination may reduce these groups' chances of participating in more productive and innovative activities, and so discourage them from investing in any development of their innovation capacities. Different theories explain discrimination based on different arguments. The "taste discrimination" theory argues that employers have a preference bias or aversion to certain groups (Becker, 1957). The "statistical discrimination" theory maintains that discrimination is based on stereotypes: in a context of information asymmetries, employers use an observable identity characteristic of a group (e.g. race or gender) as a signal for an unobservable variable (e.g. skills or productivity) (Phelps, 1972; Arrow, 1973). Others argue

that it may be favouritism towards one's own group rather than discrimination against other groups that leads to differences in labour market outcomes – or possibly a combination of both (Goldberg, 1982; Cain, 1986; Feld, Salamanca and Hamermesh, 2016).

- *Persistence of stereotypes* – Stereotyping of gender roles in society and business is still happening today; in fact it is perpetuated in subtle ways at home, in schools and in society in general. From early age, boys and girls perceive different stereotyped notions of what they should excel and enjoy in doing, which shapes their behaviours and may even affect their performance (Hill, Corbett and St. Rose, 2010; OECD, 2012a). For example, as early as the first year of primary school, girls rate their own ability in mathematics as lower than that of boys, even when their actual performance does not differ (Fredericks and Eccles, 2002; Herbert and Stipek, 2005). As attitudes and aspirations are formed early in life, such stereotypes have a critical role in shaping future academic and professional career choices; they may account in part for the low shares of women undertaking science, technology, engineering and mathematics (STEM) studies, starting their own businesses, or holding leadership positions (Box 1). Stereotyping also often affects ethnic minority groups or immigrants, with individuals assigned the expected capacities or behaviours of the group they belong to.

Box 1. Women in research and entrepreneurship activities

The low participation of women in research activities is evident in many OECD countries. While in 2013 58% of students that graduated from a higher education institution with a bachelor's degree were women (OECD, 2015d), women are less likely to choose scientific and technological fields of study: only 31% of bachelor's degrees awarded in science and engineering in 2013 went to women. Even when they do choose those fields of study, they are less likely to pursue a science career than men – 43% of female graduates versus 71% of male graduates (OECD, 2012a). They are also less likely to take up careers in research, particularly in STEM fields. In addition, the proportion of female scientists tends to fall as seniority rises (OECD, 2015c). While personal choices play an important role, women may face certain barriers to pursuing research careers, such as the existence of gender stereotypes; insufficient measures to facilitate the work-life balance; inadequate facilities for childcare; and non-transparent nomination and appointment procedures.

Women are also underrepresented in entrepreneurial activities. Between 2009 and 2013, women in the European Union were half as likely as men to be new business owners (1.8% vs. 3.5%) (OECD/EU, 2016). Evidence also shows that more women than men decide to become entrepreneurs out of necessity (e.g. due to difficulties in entering the labour market otherwise). Moreover, female-owned enterprises register on average lower profits, labour productivity and innovation outcomes than male-owned firms – which to a great extent is explained by the sectoral, size and capital-intensity characteristics of their firms. It has also been observed that female entrepreneurs rely less on external finance, but it is unclear whether this is due to personal preferences, discriminatory treatment in capital markets (e.g. in cases where they are charged higher interest rates or asked for more guarantees), or a combination of both (OECD, 2012a). An additional barrier is their lack of previous experience in management positions, as well as lower engagement in entrepreneur associations or networks.

Sources: OECD, 2015c; 2015d; 2012a.

- *Barriers to accessing finance* – While accessing finance is one of the main barriers for business start-ups as well as growing SMEs, entrepreneurs from disadvantaged and underrepresented groups frequently find it even more difficult to access formal external financing, and tend to rely more on informal sources of finance (e.g. family and friends). These individuals often lack collateral assets to offer, have short or nonexistent credit histories and lack successful business track records, and therefore generally face more stringent conditions for accessing credit. Discrimination in credit markets, and attitudes of mistrust by potential investors towards certain social groups, may also limit individuals' capacity to engage in entrepreneurship activities.

- *Weak connection to entrepreneurial networks* – Entrepreneurs from disadvantaged groups tend to have more limited business networks than other entrepreneurs. For instance, women entrepreneurs tend to rely more on networks composed of family and friends than men (Renzulli and Aldrich, 2005), as they have fewer opportunities to connect to new customers and business partners. For ethnic minorities and immigrants, barriers to building rich business networks mainly involve culture and language.
- *Living in deprived areas* – Living in deprived areas can adversely affect individuals' chances throughout their lives, including their opportunities to participate in the most productive and innovative activities. For example, studies show that people living in more deprived areas of the United Kingdom are more likely to have low income and be unemployed, have lower life expectancy, live in poorer housing in more degraded local environments, and receive poorer education and health services. Overall, living in those areas affects people's lives more than their personal characteristics (Cabinet Office & Strategy Unit, 2005).

In some cases, more than one of the above-mentioned drivers can come into play, making it especially difficult for individuals to integrate innovation activities.

Box 2. Ethnic minority and immigrant entrepreneurs

In many OECD countries, entrepreneurship is slightly higher among immigrants than natives. Overall, businesses created by immigrants generate substantial economic activity and employment. For example, in the United States, immigrants start 28% of all new businesses in the country. They are also twice as likely to file a patent, and employ one out of every ten employees (Small Business Administration, 2016).

Ethnic minority and immigrant entrepreneurs, however, often face additional barriers to those already faced by many start-ups and SMEs; that may explain why the survival rates of immigrant businesses tend to be lower than those of their native counterparts (OECD, 2010b). For instance, data for Germany show that while around 30% of native start-ups close three years after their establishment, the share rises to 39% for start-ups created by migrants (Metzger, 2016).

Many of the barriers faced by immigrant entrepreneurs are directly related to skill levels, particularly entrepreneurship skills. Research in Ireland found that entrepreneurs from ethnic minority groups have difficulties in building business networks and have low levels of management skills (Cooney and Flynn, 2008). Poor language skills and belonging to a racial or ethnic minority may be additional constraints to obtaining capital in traditional credit markets (Oliveira and Rath, 2008).

Regulatory impediments on market entry and contract enforcement can also be particularly burdensome for immigrants (OECD, 2010b).

Sources: Cooney and Flynn, 2008; OECD, 2010b; Oliveira and Rath, 2008; Small Business Administration, 2016; Metzger, 2016.

1.2. Evidence and drivers of low industrial and territorial inclusiveness

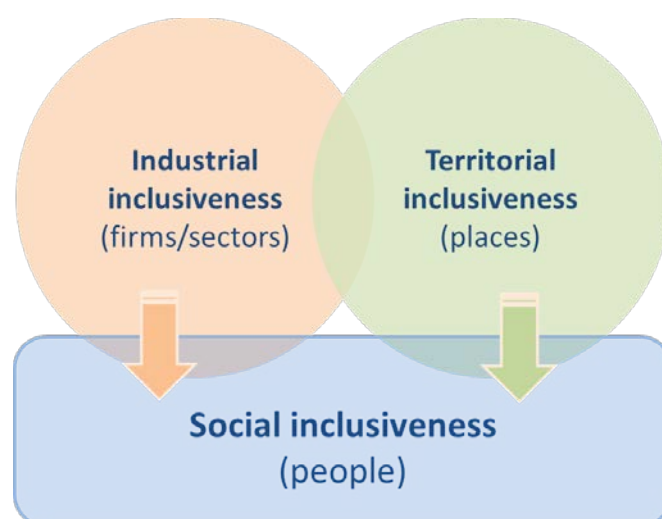
The features of a country's production system play a central role in shaping inclusive growth. The distribution of capacities to participate in innovation activities across firms, sectors and regions may be the most important of these features. Inclusiveness of national productive systems can be defined along two dimensions:

- *Industrial inclusiveness* is the extent to which the capacities to participate in innovation activities are evenly distributed across firms (independently of their size and age) and industry sectors within a county.

- *Territorial inclusiveness* is the extent to which the capacities to participate in innovation activities are evenly distributed across regions within a country.

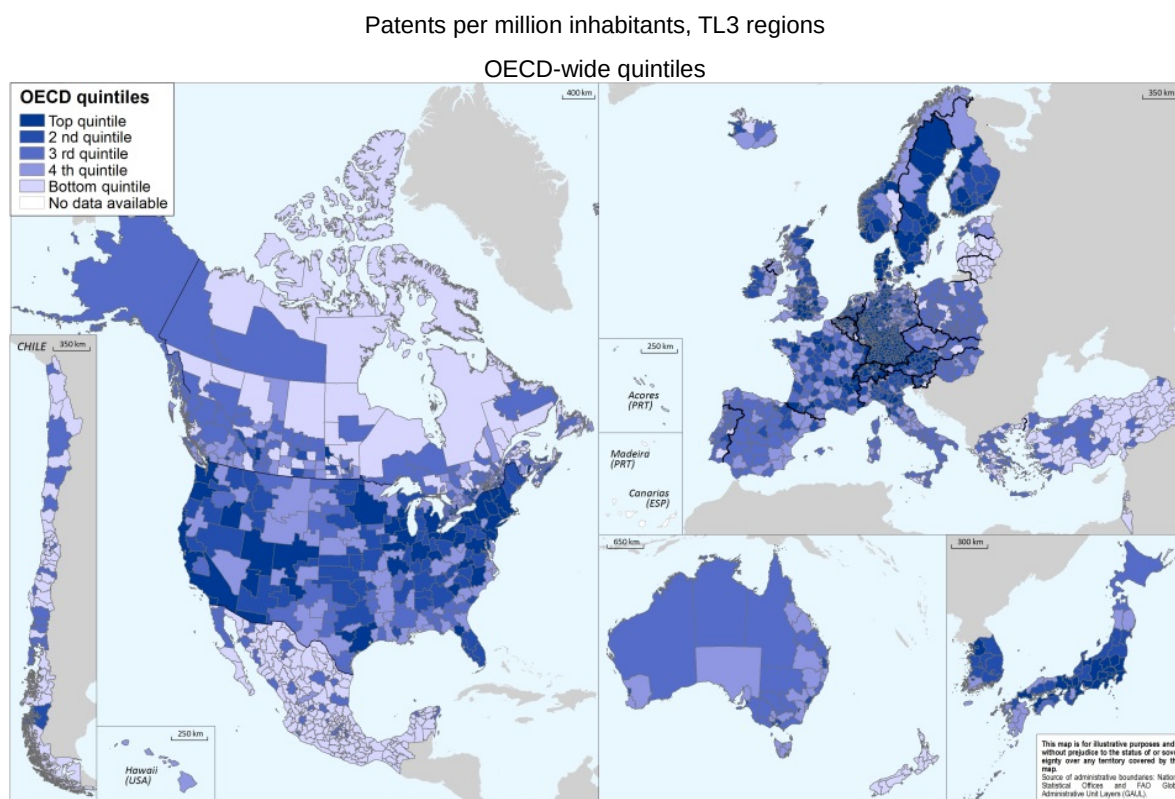
These two dimensions are closely linked to social inclusiveness (Figure 3): when innovation capacities are not widely distributed across sectors and regions, the well-being of some groups in society is negatively affected. This is particularly true for individuals working in less innovative sectors and/or living in less innovative regions that suffer from multiple factors of disadvantage (e.g. low skills, low income), as they are less able to move to more innovative activities.

Figure 3. Interactions among social, industrial and territorial inclusiveness



Evidence shows that innovation tends to be concentrated within some firms and sectors, which in turn tend to be concentrated in metropolitan areas. For example, between 20% and 65% of total R&D activities take place in the top 20% regions within countries, depending on the country. These regions also concentrate around 30% of tertiary-educated workers and about half of patent applications of their respective countries (Figure 4).

The concentration of most innovative activities would not pose an inclusiveness challenge if the benefits of innovation spread across firms and regions – that is to say, if knowledge and technology produced in the most innovative areas were diffused throughout the economy, with the resulting positive impact on productivity and well-being across all sectors and regions. Weak absorptive capacities of individuals and firms performing non-innovative activities and/or located in lagging areas frequently hinder such diffusion.

Figure 4. Regional patenting intensity in OECD countries (average 2011-2013)

Note: Calculations based on the OECD Regional Database. Regions within OECD countries are classified on two territorial levels reflecting the administrative organisation of countries. The OECD large (TL2) regions represent the first administrative tier of subnational government, for example, the Ontario Province in Canada. The OECD small (TL3) regions are contained in a TL2 region.

Source: Maguire and Weber (forthcoming)

Industrial inclusiveness: Less-innovative and traditional sectors

The uneven distribution of innovation capacities across firms has contributed to widening the gap in productivity performance between the most productive and less productive firms. The capacity of less productive firms to learn from leading firms might also have diminished, as the cumulative and frequently tacit and localised nature of knowledge makes it progressively more difficult for laggards to catch up with innovation leaders (OECD, 2015h; OECD, 2016a). This is frequently referred to as the “dual economy” problem, i.e. where the innovative, technologically advanced and highly productive sectors coexist with the traditional, low productive sectors that benefit little from new technology. Israel constitutes a case in point: the so-called “start-up nation” has a relatively small yet highly dynamic high-tech sector, which is the major driver of growth in the country, while the rest of the economy consists of traditional industries and service sectors characterised by low productivity and low wages. This dual economic structure has increased the levels of inequality and social unrest in the country (Lemarchand, Leck and Tash, 2016).

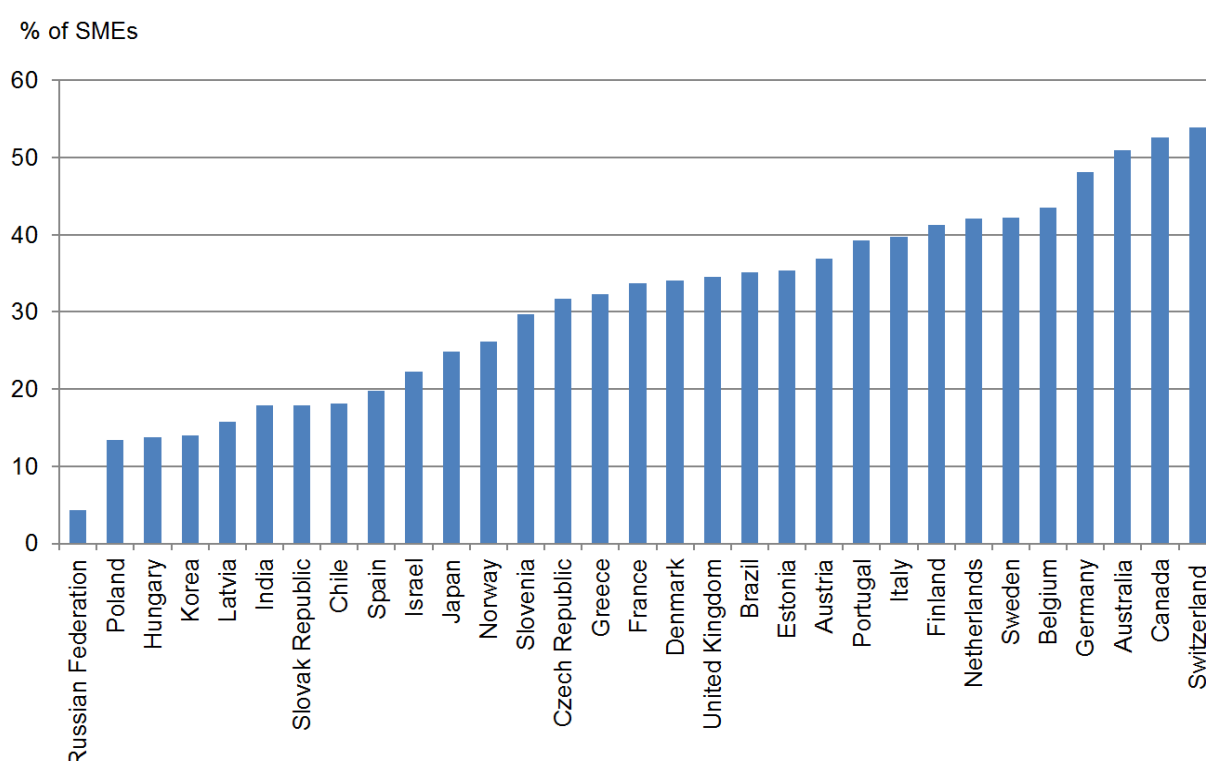
Low industrial inclusiveness thus hinders social inclusiveness. High-skilled workers in more productive firms progressively gain higher wages and benefit from regular on-the-job training and from constant interaction with other highly skilled individuals, ultimately increasing their innovation capacities. In turn, those working in less productive firms, even with similar capacities, see their wages stagnate or decline over time, have fewer training opportunities, and progressively have more difficulties move to highly productive jobs. These changes are even harder in contexts characterised by low geographical mobility of workers, rigid labour market regulations, or high levels of skills mismatch. As a result, workers with the potential to be highly productive might be trapped in low-

productivity and low-innovative activities, or suffer from long periods of unemployment in case of mass layoffs (OECD, 2016a).

Industrial Inclusiveness: Barriers to innovation faced by laggard SMEs and start-ups

While some start-ups and SMEs are an important source of new ideas, technologies and business models, the bulk of SMEs in most countries are active in mature, traditional or low-technology sectors, characterised by low knowledge intensity and weak innovation capacities. In countries such as Poland, Hungary, Korea, Latvia, the Slovak Republic, Chile and Spain, more than 80% of SMEs can be considered non-innovative, and in most OECD countries shares are above 60% (Figure 5). Those firms may be a drag on productivity, and frequently experience problems surviving in a globalised world where technological changes (namely, changes brought about by digitalisation) are constant and rapid.

Figure 5. Innovative SMEs (as a percentage of total SMEs), 2010-2012



Notes:

1. SMEs are defined as firms with 10-250 employees. Innovative SMEs refer here to firms that implemented product and/or process innovations during the period under review (regardless of whether they introduced also organisation and/or marketing innovations). Product innovation is defined as the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Process innovation is defined as the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software (OECD/Eurostat, 2005).

2. Data for Ireland, Luxembourg, Mexico and Turkey were not available at the time of publication.

3. For Australia, data refer to 2012-13; for Chile, data refer to 2009-10; for Japan, data refer to 2009-11; for Korea, data refer to 2011-13; for Mexico, data refer to 2010-2011; for Brazil, data refer to 2009-11; for the Russian Federation, data refer to 2011-13; for India, data refer to 2010-11.

Source: OECD, Innovation Indicators 2015, based on Eurostat Community Innovation Survey (CIS2012) and national data sources.

SMEs' poor innovation performance often stems from the barriers that particularly SMEs and start-ups led by individuals from disadvantaged groups and/or located in lagging areas face. These include⁵:

- *Barriers to mobilising financial resources* – Due to the high uncertainty linked to innovation projects, early stages of innovation are often costly and generate no immediate profits. SMEs and start-ups may not dispose of sufficient internal resources to finance such projects. High amounts of required collateral or little proof of previous performance may prove to be barriers for SMEs to access credit. When investments required are substantial, access to external investment can be critical. Investors, however, may not have confidence in the project's potential, may not be able to assess the entrepreneurs' ability to manage the project and its risks, or simply may not be aware of the existence of the project.
- *Difficulties in attracting skilled human capital* – Access to skilled labour is key for innovation in firms. Skilled individuals can help generate new knowledge and innovations; are more able to recognise the value of knowledge created elsewhere, absorb it and apply it to new commercial ends (Cohen and Levinthal, 1990); and can support firms in identifying business opportunities and help them adapt to changing environments. SMEs sometimes have difficulties attracting and retaining highly skilled individuals, as larger firms can prove more attractive if they offer better salary and career prospects, including opportunities for job progression and advanced training. Reputation factors might also play a role.
- *Little access to new technologies and technological as well as managerial expertise* – In general, SMEs are slower to adopt new technologies and new organisational methods. Managers may not be aware of new technologies or organisational innovations that could be useful to them; may not recognise the potential benefits of adopting them; or may lack the managerial or technological capabilities to implement them.
- *Barriers to access domestic and foreign markets* – There are a range of factors that may hinder the opportunities SMEs have to enter domestic markets, such as burdensome entry requirements ("red tape"), bankruptcy regulations that are excessively punitive for failed companies, and high costs of hiring and firing, among others. Additional barriers arise for accessing international markets, this includes difficulties in contacting foreign costumers and the high costs of establishing and maintaining foreign distribution channels and marketing networks, among others (OECD, 2008; OECD, 2009a).⁶

In addition to these barriers, *the current context in which digital innovation prevails might prove challenging for these small firms*: Digitalisation is a source of scale economies and winner-take-all market structures which may challenge small companies' market participation (Paunov and Guellec, 2017; OECD, 2016a).

Territorial inclusiveness: Lagging regions and poor urban areas

Benefits from agglomeration explain why industries (and particularly, highly innovative industries) tend to concentrate spatially: geographical proximity facilitates knowledge spill-overs and interactive learning; stimulates the creation of a larger pool of labour, leading to better matching between worker skills and jobs; and facilitates access to specialised suppliers and services (Marshall, 1890; Krugman, 1991). As a result, regions holding the greatest concentrations of innovative sectors tend to outperform other regions in terms of employment and overall economic growth.

Lagging regions (i.e. regions with per capita GDP below the national average GDP per capita) often perform poorly in terms of innovation, due to several factors. Connectivity constraints and (more frequently) the weak absorptive capacities of individuals and firms located in these regions hamper adoption of new technologies and innovations produced elsewhere. Even when firms with innovation capacities locate in those regions, they often face higher barriers to innovation, including

difficulties in accessing skilled labour, finance and knowledge networks. For instance, firms located in northern regions of Sweden have been found to have more limited access to finance compared to those in the south of the country (Inlandsinnovation AB, 2014).

These barriers may have also contributed to the rising gap in productivity performance between regions at the productivity frontier (generally urban areas) and lagging regions (more rural, peripheral regions). At the European level, for instance, innovation capacities are particularly high in Denmark, Finland, Germany and Sweden, and relatively low in eastern and southern European countries – and that gap does not seem to be narrowing (Veugelers, 2016). Similar dynamics are apparent at the national scale: in the United Kingdom, spatial economic imbalance has widened over time, with London and the South East region concentrating most of the country's economic activity (Martin et al., 2015).

The capacity of lagging regions to catch up with innovation leaders might also erode with time, as innovative environments tend to attract talent and investments and enhance entrepreneurship, thus reinforcing the concentration of resources and innovation capacities in those areas (Florida, 2002; Glaeser, 1999). Metropolitan areas such as London, New York, San Francisco and Tokyo, for instance, attract highly productive activities and highly skilled individuals, not only nationwide but even on the global scale. As more skilled individuals move to cities, absorptive capacities in peripheral/lagging areas decrease. As a result, opportunities for people living in such regions are reduced.

Spatial segregation within metropolitan areas constitutes an additional challenge for social inclusion. The concentration of various dimensions of disadvantage (e.g. lower incomes, lower skill levels, etc.) frequently combines with stigmatisation of place of residence, making it more difficult for disadvantaged groups to access good quality jobs and move up the labour market ladder. Those individuals, even those living close to innovation hubs, can be locked in low-productivity and low-income traps, unable to reap the benefits of innovation and growth produced in their vicinity.

2. Innovation policies for tackling social, industrial and territorial inclusiveness challenges

2.1. Innovation policies and inclusive growth

Traditionally, innovation policies have focused on fostering growth. Innovation (i.e. the implementation of new or improved products or processes, or new marketing or organisational methods) is considered a key engine for growth: it enhances the productivity and competitiveness of national industries, and boosts business and job creation. Innovation-led growth has contributed substantially to improving income and well-being across all groups in society. To that end, most innovation policies focus on:

- providing appropriate incentives to promote innovation activities, in both the private and public sectors (e.g. tax incentives for R&D, grants for R&D, venture capital)
- investing in public R&D infrastructure (e.g. public research laboratories)
- removing barriers to innovation and entrepreneurship (e.g. anti-competitive practices preventing market entry, overly strict conditions for start-ups to access credit)
- improving the framework conditions for innovation (e.g. science and technology education, mechanisms to facilitate interaction among participants in the innovation system, measures to promote the mobility of public researchers).

Innovation policies may also foster inclusiveness, for example if they lead to the development of affordable goods and services tailored to the needs of lower-income groups (i.e. pro-inclusive innovations).⁷ Moreover, inclusive innovation policies – the types of policies this paper focuses on – by design aim at promoting inclusive growth. Innovation policies may also unintendedly accentuate

disparities, for instance if they provide opportunities only for individuals holding some specific skills (e.g. excellence scholarships and grants); offer incentives that in practice benefit only some firms or sectors (e.g. R&D tax credits, which sometimes mainly benefit large firms; public procurement requirements that often tend to favour incumbents instead of young innovative firms; research grants awarded based on past performance); or invest resources in certain regions (e.g. public research spending going to the regions where public laboratories are located).

2.2. Inclusive innovation policies

Inclusive innovation policies aim to remove barriers to the participation of individuals, social groups, firms, sectors and regions that are underrepresented in innovation activities. Their objective is to provide all segments of society with equal opportunities to successfully participate in and benefit from innovation.

Many countries have begun implementing inclusive innovation policies (see Annex A for examples from different countries). While most of these policies can be broadly classified by inclusiveness type (Box 3), in some cases they simultaneously address social, industrial and/or territorial inclusiveness challenges. For example, Ireland's *Competitive Start Fund for Female Entrepreneurs* aims to promote the integration of an underrepresented group –women– in entrepreneurship activities (“social inclusiveness”) and to address critical financial barriers faced by start-ups (“industrial inclusiveness”).

The instruments used by inclusive innovation policies are not new: they include well-known innovation policy instruments such as grants to fund research projects, innovation vouchers, and entrepreneurship education schemes. The novelty resides in the new angle from which they are conceived: they are designed to facilitate the participation in research, innovation and entrepreneurial activities of those groups that currently have fewer capacities or opportunities to do so.

Box 3. Inclusive innovation policies by type of inclusiveness

Inclusive innovation policies have explicit aims to contribute to one or more of the following objectives:

- *Social inclusiveness* – These policies aim to broaden the group of innovators by including in research, entrepreneurial and innovation activities individuals and groups that do not usually participate in those activities. Policies addressing social inclusiveness proceed either by building the innovation capabilities of disadvantaged groups, or by facilitating their access to opportunities to participate in innovative activities.
- *Industrial inclusiveness* – These policies aim to support innovation activities in less innovative firms (including micro-entrepreneurs, small and medium-sized enterprises and start-ups) and traditional sectors. The focus is on strengthening their innovation capacities, as well as on building the adequate business environment for innovation.
- *Territorial inclusiveness* – These policies target lagging and less innovative regions with the aim of narrowing the performance gap with leading innovation regions. They foster the innovation capacity of individuals and firms located in peripheral regions, as well as in disadvantaged neighbourhoods within large urban areas.

Inclusive innovation policies also often involve implementing several complementary policy instruments. For example, the *Encouraging R&D in Traditional Industries* programme in Israel offers both financial support (in the form of grants) and non-financial support (in the form of professional counselling services) to firms in traditional sectors that decide to undertake an R&D project. This is to ensure that firms make the most of the funding provided, and to guide them in the design of a more innovation-focused business strategy. Given the variety of policy instruments used and the multiple ways of combining them, this paper classifies them by the following main objectives:

- Fostering the integration of disadvantaged groups in innovative activities (Section 2.2.1).
- Addressing barriers to entrepreneurship faced by disadvantaged groups (Section 2.2.2).
- Enhancing innovation in lagging areas (Section 2.2.3).

2.2.1. Instruments to foster the integration of disadvantaged groups in innovative activities

Building capacities

Researchers from disadvantaged or underrepresented groups frequently face significant barriers during their research careers (e.g. more difficulties in accessing funding, problems in combining research careers with familial responsibilities). These challenge their access to more senior positions in research institutions. Instruments to address such barriers include the provision of:

- *Targeted grants to fund research projects led by researchers from disadvantaged groups.* This approach is followed by *Thuthuka* programme in South Africa, which specifically targets 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. In Korea, the Centre for Women in Science, Engineering and Technology (WISSET) provides grants to support engineering research projects led by female graduate students, in order to support their research and leadership capabilities.
- *Funds to research institutions to improve the research environment for women.* An example is the *Programme to Support Research Activities of Female Researchers* in Japan. The programme's goals are to increase the number of women in research, improve their research skills, and support their appointment to leading positions. Plans designed by research institutions may include measures such as providing researchers (regardless of gender) with assistants during specific "life events" (e.g. childbirth, childcare, care of elderly relatives) so that they can balance research with personal responsibilities; establishing flexible employment arrangements, including flexitime, job sharing and part-time work; providing childcare services; and encouraging female students to pursue an academic career.

Entrepreneurship skills are crucial for starting and operating a business. These include skills in the fields of finance, marketing and human resources management, as well as capacities to identify new opportunities. Disadvantaged groups are likely to have less experience and a weak knowledge base to start and manage a business. Instruments to build those capacities include:

- *Entrepreneurship education in schools.* Primary schools can play a key role in shaping positive attitudes towards entrepreneurship, while secondary school can incentivise the acquisition of certain technical skills, such as business planning and access to finance (OECD/EU, 2016). Other less formal activities might be highly effective in increasing the interest in entrepreneurship of students from most disadvantaged groups. The *Mosaic Enterprise Challenge* of The Prince's Trust in the United Kingdom is an annual inter-school competition where students aged 11-16 years, with mentor support, learn about establishing and running a business through a business simulation game. The winning team is then supported in developing and launching their business idea (Prince's Trust, 2016).
- *Entrepreneurship courses in the context of vocational education.* These courses allow reaching more disadvantaged groups that are less likely to attend higher education institutions. They should focus on strengthening practical skills to apply to real business situations. The strong links vocational education centres often have with the business community can facilitate their opportunities to engage in traineeships and strengthen their business-related skills through practical experience (OECD/EU, 2016).

- *Entrepreneurship training provided out of the formal education system* (e.g. courses within active labour market initiatives) may be particularly relevant for disadvantaged youth and older people with low levels of educational attainment (OECD/EU, 2016).

Another, more longer-term policy objective that can help integrate disadvantaged groups in innovation activities is to strengthen the scientific literacy of the general public. Relevant policy instruments include:

- *Investment in high-quality science education for all.* The *National Action Plan for Scientific Literacy* in China, for example, promotes increasing investment in compulsory scientific education and in public education infrastructure, including science and technology museums, 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.
- *Projects for communication regarding and popularisation of science and technology.* For example, the National Council for Science and Technology Communication (NCSTC) in India implements a range of initiatives to disseminate scientific knowledge, making use of folk, 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 audiovisual displays. Since 2015, it has aimed at raising awareness among all groups of society as to how climate change can be combated through mitigation and adaptation (Department of Science and Technology, 2016).

Addressing discrimination and stereotypes

Some groups in society are confronted with discrimination that reduces their employment prospects and their opportunities to engage in innovation activities. Addressing discrimination is complex, as it is not simply related to the aforementioned “taste discrimination” theory that is to be addressed explicitly in education (Becker, 1957). Much discrimination relates more to “statistical discrimination”, i.e. contexts where stereotypes inform decisions because the other party (as e.g. an employer) does not have information on individuals and so judges an individual’s potential performance based on perceived characteristics of a group (Phelps, 1972; Arrow, 1973). This is more difficult to address, particularly if a group has already been at a disadvantage in engaging in certain activities. Gender stereotypes, for instance, often render it much harder for women to engage in a research career in STEM. The challenge is amplified if favouritism towards one group leads to less support to outsiders (Goldberg, 1982; Cain, 1986; Feld, Salamanca and Hamermesh, 2016). Instruments to address discrimination and stereotypes include the following.

- *Awareness raising activities.* These can be targeted at the general public or at students in schools and universities. The *Programme to Support Research Activities of Female Researchers* in Japan, mentioned above, promotes research careers in STEM for women in high schools and colleges through promotional materials and events allowing girls to meet female senior staff in research positions.
- *Role models* are one of the most effective ways to tackle stereotypes. For example, Sweden’s *Women Ambassadors* programme encouraged voluntary women entrepreneurs to act as “ambassadors” and share their experiences with other women. The ambassadors participated in events and made presentations about their backgrounds and success stories as entrepreneurs to high school, university and vocational training students, career advisors, and women with an immigrant background. Some of the ambassadors later acted as mentors or coaches. Similarly, Ireland’s *Going for Growth* programme features the contribution of so-called “lead entrepreneurs” – successful women entrepreneurs who help inspire other women who are already owners and/or managers of a business and have been for at least

two years. Lead entrepreneurs support these aspiring businesswomen in setting and achieving growth objectives for their businesses in interactive roundtable sessions where everyone can share experiences and thoughts (OECD/EU, 2016).

- *Mentoring programmes.* In Korea, *WISSET's Girls Mentoring Program* aims to help young women in high school develop their college study plans, with female professors and college students as their mentors. An online mentoring system and cyber community also allow mentees to communicate and conduct online activities with other members. Participants can share their experiences, encouragement and information via small group communities.

Providing incentives to invest in (inclusive) innovation

Less innovative SMEs and firms in traditional sectors might lack sufficient incentives or resources to invest in innovation, or to increase the participation of disadvantaged groups in their innovation activities. Instruments to increase those incentives include:

- *Grants*, i.e. capital transfers from the government to the recipient with no repayment requirements. For instance, Israel's *Encouraging R&D in Traditional Industry Programme* incentivises firms in those industries to invest in research and development (R&D) projects through grants covering 50% of projects' expenses (labour costs, equipment, acquisition of intellectual property, etc.). The *Support Programmes for Companies from the Ultra-Orthodox and Arab Minority Communities*, also in Israel, incentivise companies that have at least 33% of their share capital held by an entrepreneur of a minority group or from the ultra-Orthodox community to engage in product development projects by providing grants covering 85% of the project's budget (up to EUR 480 000). To promote female entrepreneurship, Ireland's *Competitive Feasibility Fund for Female Entrepreneurs* offers women-led early-stage companies with potential for success in global markets a grant to fund business feasibility studies, covering up to 50% of eligible expenditures. To avoid misuse of public resources, grant programmes frequently set precise conditions for their provision (e.g. conditions regarding the final use of the money, the requirement of private co-funding).
- *Repayable grants.* Israel's *Programme for Companies to Establish R&D Centres in the Periphery* promotes territorial inclusiveness by incentivising firms to locate innovation activities in less-developed regions. The programme requires large companies to repay the grants offered if commercial revenues are generated as a direct result of the R&D project supported, at a rate of 3% of the grant value per year on successful projects (smaller firms at a rate of 1.5% a year).

2.2.2. Instruments to address barriers to entrepreneurship faced by disadvantaged groups

Facilitating access to finance

Access to finance is often one of the major barriers for entrepreneurs from disadvantaged groups. Relevant instruments to address these barriers include the following.

- *Microcredit (or micro-loans)*, aside from credit more generally, are very small loans to borrowers who typically lack collateral and a verifiable credit history, and thus have difficulties accessing credit from traditional banks. The *European Progress Microfinance Facility Programme* implemented in Lithuania, for example, provided micro-loans to women entrepreneurs with favourable conditions for credit provision and repayment. Credit was provided within 1-2 business days for companies with less than 10 employees; no fees were applied on the provision of loans; and clients were able to defer the beginning of credit repayment up to 12 months. The *Kiút* programme, implemented in Hungary as an adjusted version of the Grameen model, provided micro-loans to groups of five individuals with low

disposable income and located in disadvantaged areas (mostly from the Roma minority). One-year tenor loans had to be repaid weekly with an annual interest rate of 15%.

- *Equity financing* is another tool to help entrepreneurs raise enough financial resources to undertake their project. The government, generally through a state-owned enterprise or a government agency, acts as an equity investor, taking shares in the targeted business that provides it with some form of ownership. Consequently, entrepreneurs do not have to comply with regular payments to the investor; instead, the investor participates in the gains when they occur and has losses when the business performs badly. For example, Ireland's *Competitive Start Fund for Female Entrepreneurs* programme provides equity investment to women entrepreneurs to support costs associated with developing the business plan and making progress on key technical and commercial milestones, including salaries, travel expenses and consultancy fees. Successful applicants receive an equity investment of up to EUR 50 000 from Enterprise Ireland for a 10% shareholding in the company. Another example is in Sweden, where the government created a state-owned venture capital company to support firms in the country's northern regions with growth potential but facing difficulties in accessing finance due to their peripheral location (Inlandsinnovation AB, currently being integrated under the national development company *Saminvest AB*). Investments preferentially target early-stage companies, and account for 10% to 30% of company shares.
- *Financial education* is key to ensuring that disadvantaged groups can effectively access financial resources and make the most of them. To that end, financial education courses should focus on increasing the target group's awareness of the existence and conditions of the forms of finance available to them, and on strengthening their skills in making effective decisions in different financial contexts (OECD/EU, 2015; OECD/EU, 2016).

Financial support schemes are typically complemented with other measures to strengthen the capabilities of entrepreneurs and increase the chances of their ventures' success. Such measures can include training to build entrepreneurship skills, coaching and mentoring schemes, business development support (e.g. counselling, technology transfer assistance) and support for building networks.

Providing business development support

Business development support services aim to help entrepreneurs start a new business or improve the performance of their enterprise by enhancing their ability to compete in and access new markets. Support services include the following (OECD/EU, 2016):

- The *provision of information to entrepreneurs* about where they can go to seek professional assistance – for example through websites and media campaigns, or through public employment services and other institutions such as chambers of commerce. The *Initiative for Start-ups and Business Transfer* (IFEX) implemented in the German State of Baden-Württemberg, for example, launches public awareness campaigns (both online and through face-to-face seminars) that target immigrant entrepreneurs, informing them about existing support programmes that could help them strengthen their business skills, build networks or address the barriers to business development they might face.
- *Coaching and mentoring* develop entrepreneurial skills. While coaching focuses exclusively on honing skills, mentoring also aims at enhancing entrepreneurs' personal development (OECD/EU, 2015). Under the *Competitive Start Fund for Female Entrepreneurs* in Ireland, successful applicants are appointed a business mentor for 10 one-on-one sessions. Under the *Commercial Advisors Scheme of the Maori Innovation Fund* in New Zealand, Maori groups can contract commercial advisors to help their business development.

Key factors for the success of coaching and mentoring schemes are the following, as set out in OECD/EU (2015):

- Building trusting relationships with the mentor. For this reason, many initiatives seek coaches and mentors from the same business community as the target entrepreneur, or with previous experience working with them.
 - Ensuring a good match between the coach/mentor and the entrepreneur, by considering both individual and business characteristics.
 - Setting clear objectives of the relationship at the start, and tracking progress towards the goals.
 - Establishing a fixed duration for support, to avoid relationships of dependence.
 - Providing training to coaches and mentors to strengthen their ability to transfer knowledge, and improve their understanding of the specific barriers faced by entrepreneurs from disadvantaged groups.
- *Professional business counselling or advice to entrepreneurs* is frequently part of broader support schemes, and a condition for receiving financial support. For example, the *Innovation Fund for SMEs* in China provides both financial and professional advisory support for SMEs that aim at engaging in innovative activities. Similarly, the programme for *Encouraging R&D in Traditional Industries* in Israel provides professional counselling in addition to grants to those firms in traditional industries that decide to engage in an R&D project.
 - *Assistance to access new markets*, both nationally and abroad. For example, the *Euroagri Foodchain* programme promotes products and technologies developed by its participants through the *EuroAgri FoodChain's* network, to ensure that they do not go unnoticed abroad. *Centres for Creative Economy and Innovation* in Korea provide assistance to business start-ups to help them find investors and enter the global market.
 - *Technology transfer assistance*. The *Envoy System* in China, for instance, promotes the adoption of advanced technologies in agriculture, by providing technology demonstrations and technology training by experts, among other support services. A different example is furnished by the Eastern Macedonia and Thrace Institute of Technology (Greece), which initiated a research collaboration with the European Organisation for Nuclear Research (CERN); the aim is to create a business incubator to diffuse CERN's existing technologies to the region's private sector.

Promoting networks

Another barrier faced by entrepreneurs from disadvantaged groups is their limited connection with other entrepreneurs or innovation actors. Instruments to address this barrier include:

- *Innovation vouchers*, i.e. small non-repayable grants used in many countries to help SMEs introduce small-scale innovations with the support of public knowledge providers, such as universities and public research institutes. The main purpose of innovation vouchers is to build linkages between SMEs and public research institutions, which will: i) stimulate knowledge transfer directly between public research and business; and ii) act as a catalyst for the formation of longer-term, more in-depth relationships (OECD, 2010d). Voucher programmes have been implemented in many countries, including Germany, Hungary, Ireland, the Netherlands and the United Kingdom.

The range of activities that can be funded with innovation vouchers varies by programme, and private co-funding is often required. While the outcomes of collaborations also vary, there are many examples of successful collaborations that have led to the introduction of new or improved products, services or processes by SMEs. Another measure of programme success is the extent to which voucher recipients have further contracted public research organisations for follow-up assignments paid through other means (Box 4).

Box 4. Innovation vouchers: Examples of impacts in different countries

Reports evaluating a number of relevant innovation voucher programmes show that participants deem this kind of co-operation opportunity very useful:

- All applicants in the Scottish Innovation Voucher programme indicated that the collaboration exceeded (35%) or met (65%) their expectations (BIGGAR Economics, 2010).
- Around 84% of participants in the Austrian IS and ISplus programmes reported a successful project, which ended with a new product placement on the market (48%), prototype development (12%) or test phase (24%) (KMU Forschung, 2015).
- The success rate in the German voucher programme was of around 66% (BMW, 2015).

Evaluations also found that the majority of the participants intend to continue or actually continued the collaboration. Around 22% of the Scottish partners are already working on a new project, while 33% are discussing future project opportunities (BIGGAR Economics, 2010). Nearly 50% of the Austrian partners have already embarked on a continuation of the collaboration started in the framework of the IS and ISplus programmes, and a further 17% plan to do so (KMU Forschung, 2015). Finally, almost 60% of the German participants indicated their willingness to have a follow-up project (BMW, 2015).

There have been several technology or process innovations developed and upscaled thanks to innovation voucher programmes. For instance, the Dutch company Diligent Energy Systems used an innovation voucher to contact the Technical University of Eindhoven to help improve the efficiency of the biodiesel production process using tropical plant *Jathropa*. With the help of Ph.D. students from the university, the efficiency was increased and brought close to more traditional biodiesel production processes, which made the upscaling of the project possible (EC, 2011). Another example is Axxium Ltd in the United Kingdom, which intended to start manufacturing “smart door locks” that could be remotely unlocked via a mobile device, enabling people with reduced mobility to move more freely. The company lacked the necessary technical expertise to develop electronic components for their products, but through the Innovation Voucher programme of the United Kingdom the company hired the University of Hertfordshire to develop the electronic locking mechanism. Their collaboration continued and the partner designed the actual lock and took the concept to market. The lock is currently being launched to the mass market (University of Hertfordshire, 2013).

Voucher programmes can however also face multiple challenges that might limit their effectiveness, if for example university research is little related to industry needs; if industry does not have adequate absorptive capacity or resources to implement innovations or proposed changes; if incentives for knowledge providers to engage with industry are low; if geographical distance limits regular or face-to-face interaction; or if such interactions only take place in the context of the programme but are not maintained in the future.

Sources: BIGGAR Economics, 2010; BMW, 2015; KMU Forschung Austria, 2015; European Commission, 2011; University of Hertfordshire, 2016.

- *Entrepreneurial networks* can help entrepreneurs obtain financing; find business partners, suppliers, employees and customers; and get ideas for new products, processes, organisational methods and business models. Positive peer pressure can also play an important role in stimulating business growth and innovation. To be effective, these initiatives should allow for a great deal of interaction between the entrepreneurs in the target group and the wider business community, so as to enlarge the pool of resources they have access to. Such networks should also have clear objectives. For example, they can be aimed at building international connections to facilitate exporting, or connecting with potential clients or suppliers. While face-to-face interactions are always the most effective, the creation of online entrepreneurial networks can be an effective complementary initiative (OECD/EU, 2016).

Improving access to talent by small businesses

Accessing talent remains a key barrier to SMEs, particularly when located in peripheral areas or led by disadvantaged groups. Instruments to address those challenges include:

- *Grants to recruit researchers.* To support SMEs in finding and recruiting highly skilled human capital able to manage and implement in-house innovation processes, the *H2020 SME Innovation Associate* programme, implemented in EU member states and other Horizon 2020 associated countries, provides grants to SMEs to cover the costs of employing a foreign post-doctoral researcher for up to one year (including salary and travel expenses). This is accompanied by a training package to maximise the benefits of the programme for both SMEs and researchers, while assuring smooth integration of the researcher into the business environment.
- *Access to specialised online job portals.* The *H2020 SME Innovation Associate* programme also offers all SME applicants the opportunity to benefit from publicising their job vacancies in the EURAXESS portal – the European Commission’s researcher mobility portal. This increases the visibility of their job vacancies and increases the chances of finding good matches for the advertised positions.

2.2.3. Instruments to enhance innovation in lagging regions

Accessing global knowledge and technology

Innovation happens not only when knowledge and technologies that are “new to the world” are developed, but also when these are adapted and used in new countries, regions, sectors or firms. This form of innovation is more suitable for contexts with a relatively weak knowledge base, and it is less costly and less risky than creating new technology. Policy instruments to facilitate the acquisition and use of existing knowledge and technology and its adaptation to new local contexts include:

- *Demonstration of new technologies and training provided by S&T specialists.* In China, for example, agriculture in most lagging areas still depends on outdated technology. This hinders improvement of agricultural productivity and the well-being of rural populations. The *Spark Programme* (1986-2015) was the first plan implemented to revitalise the Chinese rural economy through science and technology. It provided technology training to farmers, so as to change their traditional production methods for more technologically advanced ones. The *Envoy System* has also been implemented in China since 2002 to promote innovation in rural areas by sending qualified science and technology specialists to those areas to provide farmers with S&T services, including demonstrations, training and advice. More recently, S&T envoys’ tasks switched from agricultural technology services to helping farmers set up as S&T entrepreneurs.
- *Financial support to projects that use science, technology and innovative solutions to address local challenges.* For instance, Colombia’s Ideas for Change programme is implemented to allow vulnerable communities to identify specific needs and challenges through a virtual platform. The STI community (i.e. individual researchers, firms, universities and research institutions) can then propose specific solutions to their problems, which should be creative and involve low-cost technologies. Grants are provided to implement the selected solutions. Chile’s Prototypes of Social Innovation programme issues calls for innovative solutions to local challenges 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. The innovative solution must, in addition to answering the specific social challenge and having potentially high social impact, be suitable 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 approximately USD 60 000), while applicants are responsible for the remaining percentage. Funding is provided 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. Both programmes involve the active participation of local communities in identifying local challenges as well as in implementing the selected solutions.

Maximising the potential of existing assets

Lagging regions tend to have relatively weak human capital endowments as well as other disadvantages that hamper innovation, such as significant physical distance from innovative metropolitan areas. Nonetheless, these regions frequently have long traditions in specific agricultural or manufacturing sectors, and possess valuable traditional knowledge and/or other assets that make them singular. For instance, they might be endowed with rich natural resources and biological diversity, have a large share of young population with entrepreneurial ambitions, or have dense networks of social relations. Innovation policies that take into account these local assets and promote innovative ways of seizing their potential have good chances of being successful in fostering regional growth and territorial inclusiveness. In turn, it is necessary to avoid “picking winners”: promoting the development high-tech industries in regions that lack the adequate human and physical endowments is likely to become a failed policy and a major waste of public resources (Hospers and Beugelsdijk, 2002; Tödtling and Trippl, 2005).

Relevant instruments include the following:

- *Design of tailor-made development plans, including with regard to research and innovation.* For example, to tackle territorial disparities with regard to research, development and innovation capacities in the United States, the *Experimental Program to Stimulate Competitive Research* (EPSCoR) provides awards to territorial jurisdictions to foster their research capabilities and improve their science and engineering research and education programmes. One of the programme’s tracks provides selected jurisdictions with up to USD 20 million for five years to support physical, human and cyberinfrastructure improvements in research areas identified as having the best potential to improve the jurisdiction’s R&D competitiveness. Mexico’s *Productive Territories* programme, for example, designates technical teams in charge of designing development plans for specific poor rural areas, taking into account existing assets and local needs. The technical team also ensures that local communities access all federal support programmes for which they are eligible.
- *Identify areas of specific relevance for a region and train potential local entrepreneurs in those sectors.* This is the main objective of the *Science and Technology Entrepreneurship Development* programme in India. The analysis of region’s potential is made by specialised agencies that receive governmental funds.
- *Use intellectual property protection, such as geographical indications, to increase the reputation of local products* (e.g. agricultural products and handicrafts). IP protection might generate resources for regional development and help integrate previously excluded groups in innovation systems (Box 5). Support for SMEs to integrate IP protection as part of their business models where such protection is appropriate can also support innovative SMEs.

Box 5. Intellectual property protection in traditional sectors: Opportunities for fostering territorial inclusiveness

Intellectual property (IP) rights for traditional activities, including agricultural products, handicrafts and traditional knowledge, offer opportunities for inclusive growth in lagging areas, as they facilitate the integration of previously excluded local communities in innovation processes. Several types of IP rights are particularly relevant for traditional sectors.

- *Geographical indications* (GI) are signs used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin (WIPO, 2016a). GI can thus result in higher prices for local agricultural products, foodstuffs, handicrafts, wine and spirit drinks, for example, compared to those from other regions, generating resources for regional development and facilitating the integration of previously excluded groups in innovation systems. They might also have spin-off effects, for example in the areas of tourism or gastronomy. Success stories such as Café de Colombia, Roquefort cheese in France and Rooibos Tea in South Africa illustrate their potential (El Benni and Reviron, 2009).
- *Traditional knowledge* (TK) is a living body of knowledge passed on from generation to generation within a community, often forming part of its cultural and spiritual identity (WIPO, 2016b). Claiming local group or community ownership over traditional knowledge can help support communities in lagging regions to engage in innovation activities. In the area of healthcare, for example, traditional medicines – such as Ayurveda, which is native to the Indian subcontinent – can act as inputs for local groups to patent and develop innovations. Research institutions and companies can provide needed research capabilities to effectively turn products with economic potential into IP-protected products that generate economic returns for local groups. Products must pass regulatory tests before they can be sold on foreign markets, a process that also requires support from research institutions. It is worth noting that local entrepreneurs have also deployed non-IP strategies to successfully market these types of products.
- *Copyright* refers to the rights that creators have over their literary and artistic work; it is the main type of IP used for creative endeavours and in the entertainment industry.

IP ownership rights do not alone generate economic value to the economy or to specific groups. Substantial investment is also needed to maintain high product quality and develop effective marketing strategies to ensure brand recognition. It is the effectiveness of brand promotion strategies that has allowed for the success of the above-mentioned examples.

Source: OECD, 2014.

- *Support to regional governments to implement science, technology and innovation projects.* Colombia's *Royalties for Science, Technology and Innovation* programme is a case in point. 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.

Attracting innovative firms to peripheral regions

Several attempts have been made across the world to try to attract firms (and particularly innovative, knowledge-intensive ones) to peripheral regions, including the following:

- *Technology parks.* In Korea, *technoparks* have been built to address the gap between the metropolitan area of Seoul and other more peripheral regions. Technology park development includes the construction of infrastructure (e.g. common business support facilities, incubators), locating of research centres and universities to increase the pool of human capital and promote R&D, implementation of networking programmes and incentives for joint R&D projects, and the provision of finance for tech-based SMEs and start-ups, including through venture and seed capital.

- *Special economic zones.* In Mexico, the establishment of special economic zones in four lagging regions of the country's south is under way, with the objective of bridging the gap with other regions in Mexico. Measures to attract foreign investments include fiscal incentives to firms investing and creating jobs in those areas, and investments in the local infrastructure and human capital.
- *Grants to promote business R&D in peripheral regions.* For example, to bridge the gap between the centre and the periphery, the government of Israel implemented a programme that provides grants to co-finance R&D expenses of large firms' R&D centres that relocate in the periphery, for a period of two to three years. The funding model offers government participation in the risks involved in establishing the R&D centre. Eligible costs covered by the grant are equipment, external expertise (consultants, studies, etc.) and labour costs (including overheads).

In order to make those policies successful in the long term and avoid the attraction of “footloose” industries (economic activities not tied to specific locations), adequate regional framework conditions for innovation are needed. Investments in human capital and infrastructures are often critical. Challenges in making these types of policy schemes work are large; there is scant high-quality evaluation evidence on the impacts of these policies to identify which conditions matter for success (Warwick and Nolan, 2014).

3. Rationales for implementing inclusive innovation policies

The rationales for implementing different inclusive innovation policies vary – but they all share a common goal, which is to tackle misallocation of resources in the economy that is due to inequalities and exclusion. This is critical to foster economic growth and job creation, as when resources in an economy are misallocated (e.g. workers with capacities to participate in innovative activities do not have opportunities due to discrimination), the economy performs below its potential.

This general rationale and other specific ones for implementing innovation policies for social, industrial and territorial inclusiveness are described below (Table 1).

Table 1. Summary of rationales for implementing inclusive innovation policies

Social, industrial and territorial inclusiveness		
• Tackle the misallocation of resources in the economy due to inequality and exclusion, fostering job creation and economic growth		
Social inclusiveness	Industrial inclusiveness	Territorial inclusiveness
• Reduce discrimination in the labour markets by demonstrating the potential of certain social groups and changing the attitudes of employers and investors towards them. • Foster social mobility and inclusion by integrating disadvantaged groups in more productive activities of the economy. • Promote diversity in research and business teams to support inclusion and growth.	• Tackle the problem of a dual economy (i.e. one divided into highly innovative/productive sectors and traditional/low production sectors) by improving the competitiveness of less innovative firms. • Promote entrepreneurship from disadvantaged groups so as to foster the emergence of new economic activities (e.g. activities addressing previously underserved needs).	• Foster the development of more productive and innovation-intensive activities in lagging regions, offering better opportunities for people living in those areas. • Increase the chances of other initiatives (e.g. investment in R&D and transport infrastructure) having their intended effects on innovation performance and growth. • Strengthen regions' economic resilience and reduce their dependence on transfers from the central government.

Note: Innovation policies for industrial and territorial inclusiveness indirectly support social inclusiveness. For presentation purposes, policies are classified in this section by main type of objective.

3.1. General rationale for implementing inclusive innovation policies

Inclusive innovation policies tackle in particular the misallocation of human resources (and to a certain extent technologies) across the economy as a result of the limited opportunities of some groups or firms to participate in innovation activities. Such misallocations may arise due to discrimination in labour markets, barriers to access to financial resources that specifically affect smaller players, and low geographical mobility of workers, resulting in significantly lower levels of productivity.⁸ Tackling the specific barriers that challenge participation in innovation such as, for instance, limited access to resources on financial markets can complement innovation policy efforts. However, very often these policies alone are not sufficient because low participation in innovation activities often stems from a combination of barriers. Capacity-building is often also essential to raise participation in such activities. Consequently, innovation policies are an adequate means to addressing inclusive growth.

Inclusive innovation policies have the potential to reduce resource misallocation, leading to increases in terms of aggregate productivity and well-being, in particular by:

- Fostering the integration of previously disadvantaged groups in research or innovation activities, and by promoting entrepreneurship by those groups. The study of Hsieh et al. (2013) shows that the improved allocation of skills in the United States due to the integration of formerly discriminated groups in the labour markets, including African Americans and women, may have accounted for 15% to 20% growth in aggregate output per worker over the past 50 years.
- Promoting firm growth and job creation in the formal economy, e.g. through the support provided to early-stage start-ups and SMEs led by disadvantaged groups. The removal of barriers to their participation in innovation activities can further contribute.
- Addressing credit market failures faced by entrepreneurs from disadvantaged groups (e.g. overly strict conditions for accessing credit, high borrowing costs). Some studies point out that credit market failures might partly explain cross-country differences in productivity and adoption of new technologies (Banerjee and Duflo, 2005).
- Promoting technology transfer, i.e. the adoption of new technologies or organisational methods by firms in less innovative sectors (e.g. agriculture, traditional sectors). This is crucial, as barriers to technology adoption facing firms might at least partly explain differences in economic development between countries (Parente and Prescott, 1994; OECD, 2015h).
- Increasing the productivity and innovation performance of less innovative firms and sectors – e.g. through provision of training or business support services – which increases the productivity of resources used.

3.2. Rationales for implementing innovation policies for social inclusiveness

Reducing discrimination in labour markets

Some inclusive innovation policies address labour market discrimination, which is detrimental to well-being and economic performance. They do so by helping demonstrate the potential of certain social groups and changing the attitudes of employers or investors towards them. They thus create a dynamic whereby: i) recruitment is based on objective, non-discriminatory criteria, thus increasing the chances of recruiting the workers that are best suited for each job; and ii) future investments would be targeted to most efficient activities, regardless of the group undertaking them, thus making those investments more sustainable in the long run.

Discrimination has negative impacts on individuals and economies at large. Individuals suffering discrimination also suffer from lower incomes and poorer health status, stemming from higher psychological distress, lower self-esteem and related mental health problems (Choi et al., 2013; Versey and Curtin, 2016). In turn, firms that discriminate narrow the pool of employees considered in recruitment processes, resulting in lower productivity and profits (Lanning, 2010). At the aggregate level, discrimination can lead to depressed wages and underemployment for a high share of the discriminated population (Baldwin and Johnson, 1996). That might create a disincentive for these groups to invest in further education and training, as their (average) return on such investments are below that of non-discriminated groups, thus limiting future opportunities for those individuals and aggregate economic growth (Milgrom and Oster, 1987). This is because individuals who are being discriminated against will receive less for the same productivity, qualifications and skills, and would not have the same opportunities in the labour markets due to some identity factor, such as gender, race, age, disability status, or place of residence.

Fostering social mobility and inclusion

Inclusive innovation policies can foster both social mobility and inclusion by integrating disadvantaged groups into more productive activities of the economy, both by: i) enhancing their innovation-related skills; and ii) facilitating their access to opportunities, particularly by addressing specific barriers faced by these groups (e.g. when establishing their own businesses). The successful integration of disadvantaged groups in innovative activities is expected to improve their economic status and general well-being (including in terms of job satisfaction), and increase their chances for upward social mobility. Inter-generational upward social mobility is also expected to have positive effects on economic growth by improving the allocation of talents and abilities in the economy (Galor and Tsiddon, 1997; Causa, Dantan and Johansson, 2009).

Integration of disadvantaged groups into productive activities is also likely to increase their involvement in the social, political and cultural life of society, and to strengthen their sense of belonging to a community. Social cohesion in turn benefits norms and institutional rules leading to less risky co-operation, increased innovation and creativity, and higher participation in civil society. Higher social cohesion can strongly enhance people's well-being (Eurofound and Bertelsmann Stiftung, 2014) and have positive impacts on the economy (Birdsall, Ross and Sabot, 1995; Easterly, Ritzen and Woolcock, 2006).

In addition, inclusive innovation programmes are ever more relevant as tax and redistributive policies have become less redistributive in many countries: taxes and transfers now lower inequality by about 29% in the sample of 13 OECD countries⁹ where long-term data were available, which is less than in the mid-1990s (OECD, 2011a). This trend has negatively affected the low-income groups, particularly since the financial crisis. The main reasons for the decline in the redistributive capacity of taxes and transfers are the reduction in benefit generosity, the tightening of eligibility rules, and the failure of transfers to the lowest income group to keep pace with earnings growth (OECD, 2015e). In this context, public policies that foster inclusiveness without imposing long-term weight on public budgets, and that increase the chances of effectiveness of public funding become ever more relevant.

Promoting more diverse teams to support inclusion and growth

A number of inclusive innovation policies, by fostering the integration of underrepresented groups in innovation, research and entrepreneurial activities, promote diversity in those activities. This is particularly the case of policies aimed at increasing the participation of women and minority groups in public research activities, such as the *Programme to Support Research Activities of Female Researchers* in Japan and the *Thuthuka* programme in South Africa.

Diversity, both inherent (e.g. race, gender) and acquired (e.g. experience, educational and cultural background), is increasingly considered an asset for firms and research teams. For instance, Freeman and Huang (2015) found that papers written by diverse groups of researchers received more

citations and had higher impact than those written by people from the same ethnic group. Diversity may also help boost firms' innovativeness (Talke, Salomo and Kock, 2011) and may lead to more sales and profits (Herring, 2009; Talke, Salomo and Kock, 2011; Dezsö and Ross, 2012; Credit Suisse, 2012). While there are differences in findings regarding the impacts of different dimensions of diversity, it is generally considered that diversity can lead to more creative thinking and problem solving than would be the case in homogeneous teams.

3.3. Rationales for implementing innovation policies for industrial inclusiveness

Tackling the problem of dual economies

Inclusive innovation policies can 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, 2015h; OECD, 2016a). 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 address this problem by enhancing the competitiveness of less innovative firms to help them avoid lagging further behind, in particular by:

- Facilitating their access to technologies or organisational innovations created elsewhere that could be useful in increasing their productivity. This involves increasing awareness of the existence of such technologies, as well as providing the necessary capacity building or financial support to help firms benefit from them. An example is the *Envoy System* and *Spark Programme* in China.
- Promoting small-scale innovations in less innovative sectors. For example, the *Encouraging R&D in Traditional Industries* programme in Israel provides support to traditional industries undertaking R&D projects, to help bridge the gap between less and more innovative industry sectors.
- Supporting SMEs and start-ups from more disadvantaged groups overcomes barriers. For instance, the *European Progress Microfinance Facility Programme* implemented in Lithuania addresses the barriers women micro-entrepreneurs face in accessing financial services.

It is important to note that these policies support firms and sectors that have the potential to be economically profitable and innovative, and not those performing non-sustainable, declining or obsolete activities.

Fostering new economic activities

Some inclusive innovation policies support the emergence of new economic activities, leading to higher economic diversification. This is particularly the case of inclusive innovation policies that foster entrepreneurship among disadvantaged or underrepresented groups, such as *Competitive Start Fund for Female Entrepreneurs* in Ireland, as well as those that promote the development of innovative solutions for regional challenges, such as the *Prototypes of Social Innovation* programme in Chile. Some of these new activities 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, 2015f).

Having several economic activities can raise economies' resilience to negative shocks in demand that may affect specific sectors. The more diversified the economy, the higher are the opportunities for risk diversification. In this view, higher diversification leads to more sectors open to investment, because of which a larger number of investors will invest in risky projects ensuring better perspectives

for long-run growth. In spite of this, the debate on whether economic specialisation or diversification is more desirable to spur economic growth has still not concluded (Box 6).

Box 6. Economic specialisation and diversification: literature overview

The role of economic specialization and diversification in economic development is a much debated question in economics. Adam Smith was the first to describe the benefits of specialisation of nations in terms of absolute advantages. He argued that nations should specialize in goods they could efficiently produce and trade them for others they could not produce so efficiently. David Ricardo later formulated the classic trade theory based on comparative advantage, which shows that even countries that do not have absolute advantage in the production of any products or services benefit from specialising in the production in which they have a relative production advantage and importing others, no matter the product and no matter the degree of specialisation.

At the same time and aside from issues related to the effect of shocks, the structural models of economic development suggest that countries should diversify their economies from simple to more sophisticated production technologies in order to achieve sustainable and less volatile growth (UNIDO, 2009). Koren and Tenreyro (2007) show that poor countries tend to specialize in sectors with relatively simple production technologies and a narrow range of inputs (as the theory of comparative advantage proclaims) and therefore are more vulnerable to economic shocks. Van der Ploeg and Poelhekke (2009) find that specialization in sectors producing and processing raw materials results in more volatile economic growth since commodity products are often subject to volatile global market prices. Nonetheless, resource abundance can be used as a springboard for diversification, moving to related production sectors (Ferreira and Harrison, 2014; Hesse, 2008; Herzer and Nowak-Lehmann, 2006).

Reconciling both perspectives, some recent studies highlight that richer, more developed countries may be better off if – after a certain level of diversification – they “re-specialize” in certain high-productivity sectors: Imbs and Wacziarg (2003) were the first to find a non-linear relationship between diversification of production and GDP per capita, namely a U-shaped pattern whereby countries in the early stages of development diversify production and specialise at higher income levels. Klinger and Lederman (2006) and Cadot et al. (2011) find a similar U-shaped pattern in the case of export diversification. In contrast, Parteka and Tamberi (2008) and De Benedictis et al. (2009) find that economic diversification and growth are positively associated in all stages of economic development.

Sources: Cadot, Carrere and Strauss-Khan, 2001; De Benedictis, Gallegati and Tamberi, 2009; Ferreira and Harrison, 2012; Herzer and Nowak-Lehmann, 2006; Hesse, 2008; Imbs and Wacziarg, 2003; Koren and Tenreyro, 2007; Parteka and Tamberi, 2008; UNIDO, 2009; Van Der Ploeg and Poelhekke, 2009.

3.4. Rationales for implementing innovation policies for territorial inclusiveness

Many territorial inclusiveness policies respond to the rationales described above that relate to social and industrial inclusiveness. Rationales specifically for territorial inclusiveness policies include fostering the development of more productive and innovation-intensive activities in lagging regions, by supporting entrepreneurship and the development of these activities. Strengthening the innovation capacities of lagging regions (i.e. the absorptive capacity of individuals and firms located there) also increases the chances of other initiatives, such investment in R&D and transport infrastructure, to have their intended effects on innovation performance and economic development. Increasing the innovation capacities of peripheral, less developed regions is also expected to strengthen their economic resilience and reduce their dependence on transfers from the central government.

3.5. Inclusive innovation policies complementing other policy tools

In their diverse objectives, inclusive innovation policies are complementary to other policy tools, particularly to education policies. The latter include policies to ensure equal access to high-quality education (from early childhood to tertiary level); to encourage attendance at school of children from disadvantaged backgrounds; to promote high educational attainment by all segments of society; and to reinforce STEM and entrepreneurship skills. Improvement in and promotion of vocational education are also likely to enhance the participation of individuals from disadvantaged groups in more

productive activities, as they are more likely to enrol in these programmes than in tertiary-level education.

Inclusive innovation policies are also complementary to labour market policies. These include measures to support women's participation in the labour market, such as policies on maternity and paternity leave; activation programmes for the unemployed, which facilitate their transition to higher-productivity jobs; measures to integrate immigrants and minorities into the labour markets; and programmes to promote quality apprenticeships, internship programmes, and on-the-job training. Such programmes increase individuals' opportunities to progressively adapt to changes in job requirements, particularly for those with lower levels of education. More generally, unemployment insurance programmes allow for smoothing the consumption patterns of job losers, while minimum wage regulations ensure that "fair" wages are paid to unskilled workers. These measures, the specificities of which vary greatly across countries, are important tools against vulnerability and social exclusion.

Finally, the quality of life of individuals relates to access to good-quality public services in addition to benefiting from inclusive innovation policies that facilitate their access to opportunities in more productive sectors. Public services that are key to inclusiveness, financed through progressive tax systems, include public education and health systems, social housing, public transportation services, and public childcare and elderly care services.

4. Specific implementation challenges and policy responses

Inclusive innovation policies, in focusing on disadvantaged groups (social inclusiveness) and laggard industries and regions (industrial and territorial inclusiveness), need to address some specific challenges that do not apply to the same extent to innovation policies more generally. Notably, they need to raise the target group's awareness of the policy programmes and increasing their involvement (Section 4.1); establish programme selection criteria that allow to effectively reach the target group and support innovation activities (4.2); build the target group's capabilities to undertake activities promoted by the programme (4.3); and build the expertise of public sector officials and experts deploying the programmes (4.4).

Other general policy design prerequisites for inclusive innovation programmes, similar to other innovation policies, include having an in-depth understanding of the actual needs of the target group before setting policy objectives, and articulating these objectives in a clear way. Institutional barriers and ensuring adequate evaluation of policy impacts also need addressing. More detail on those general principles are discussed in the OECD Innovation Strategy (OECD, 2015g).

4.1. Ensuring the involvement of the target group in policy programmes

The target group of inclusive innovation policies (e.g. minority groups, less innovative SMEs, firms in traditional sectors) might in some cases not be aware of, be misinformed about or be unwilling to engage in the programmes for which they could be eligible. Linguistic barriers and low access to conventional media by the target group, among other factors, might hamper the effectiveness of communication and dissemination measures built around the programme. For example, implementation the *Prototypes of Social Innovation* programme in Chile was initially hindered by the misunderstanding of the notion of "social innovation" among the target groups, which led to low levels of participation in workshops aimed at identifying major social challenges at the local level.

Often the target groups of inclusive innovation policies might also have had little previous contact with governmental programmes, or feel an aversion to the prospect of long bureaucratic application processes. As a result, 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 resistance to its implementation. This is different from innovation policies that target the strongest

performers; those often have long-standing relationships with governmental agencies and consequently will be much more ready to engage. For example, in the context of the *Ideas for Change* programme in Colombia, some communities in more remote areas were initially reluctant to have the government and the research community provide solutions to their needs, due to the lack of trust. During the implementation of the *Kiút* programme in Hungary, convincing the target group (mostly low-income individuals from the Roma minority with no experience in dealing with bureaucratic procedures) to apply to the programme became an important implementation challenge. This partly explains the fact that, from the original aim of 400 recipients, only 138 finally received microloans. Similarly, during the implementation of the *European Progress Microfinance Facility Programme* in Lithuania, the bank in charge of providing loans to (mainly female) micro-entrepreneurs had difficulties allocating the funding due to lack of demand (in part due to expensive rates on products): from EUR 5 million available, only EUR 1.91 million were committed.

The following approaches have been used to address those challenges (Table 2):

- In the framework of a programme, design an outreach strategy that is tailored to the target group. This might include using the media channels that are most widely used among the members of the target group, general awareness raising campaigns and role models.
- Engage the target group in the design and/or implementation of the programme.
- Communicate the objectives, activities and benefits of the programme to the target group through a member of the same community or group (e.g. a supportive community leader, a member of a traditional industry association), or someone who has previously benefited from the programme. Role models (e.g. successful women entrepreneurs or researchers) can also play a key role in encouraging potential beneficiaries to engage in programmes.
- Promote interaction among the target group, the STI community and government actors. This includes the creation of online platforms where different actors in a community can interact to identify local challenges and possible solutions.
- Provide information about the benefits of science and technology, research and innovation.
- Streamline and simplify administrative processes linked to the programme, so that target groups are not discouraged to apply as a result of complex bureaucratic procedures.

4.2. Establishing selection criteria to reach the target group and support innovation activities

Overly strict competitive selection criteria might disqualify individuals from disadvantaged groups as well as laggard firms and regions. For example, the *Thuthuka Programme* in South Africa could not receive the necessary number of applicants as the eligibility criteria were very demanding. The Latvian *Measure for Commencing Commercial Activity or Self-Employment* programme, which aimed to support business creation by unemployed individuals, encountered similar challenges (OECD/EU, 2016).

In turn, eligibility criteria that are not specific enough (e.g. vague definitions of what are considered innovation activities, lagging firms or disadvantaged groups) and insufficient monitoring of policy implementation may result in policies benefiting firms that are not in need for such funding. In other cases, some firms might define as “innovative” some of their usual activities, or introduce changes to comply with requirements but with no effective long-lasting impacts on inclusiveness and the innovation performance of firms (such as recruiting workers from minority groups without giving them the opportunity to engage in research), with benefiting from funding the only objective. For example, some beneficiaries of the *Hungarian Innovation Voucher* programme were found to use vouchers to finance their “usual” innovation activities. This is known as the “crowding out” effect of public funding.

The following approaches have been used to address those challenges (Table 2):

- Establish selection criteria that go beyond skills and past performance to also value applicants' motivation and potential for success, taking into account the objectives of the intervention.
- Clearly define the scope of activities that could be supported and plan monitoring activities to confirm effective implementation of the programme. This could also involve setting rewards for results.
- Establish criteria to select firms with the potential to become profitable businesses and create jobs.
- Provide public support that is conditional on the participation of the private sector in financing the programmes, and establish fixed monetary and temporal limits for the provision of public funding. This increases chances of public funding being allocated to projects with positive returns on investments and long-term impact.
- Involve third party organisations, experts and the target group itself in designing the programme's structure, including the application procedure and the eligibility and award criteria.
- In some cases, equity investment can be an adequate alternative to loans and grants to reduce the risk of moral hazard.

4.3. Building the capabilities of those in the target group to undertake activities promoted by the programme

The lack of sufficient capabilities among the targeted group or within the targeted industry sector or region may prevent achievement of the programme objectives. For instance, under the *Productive Territories Programme* in Mexico, local development plans identify, support and implement economically relevant business opportunities for disadvantaged groups. The success of the programme has however been limited, in that many projects did not start or, where they did, they remained unprofitable because of shortcomings in the entrepreneurial skills of those involved. Hungary's *Innovation Voucher programme*, which helps SMEs engage in innovation with the help of research institutes, universities or independent experts, has also so far not met expectations. Only few firms engaged, and in a range of regions research institutions and universities did not have adequate capabilities to support them. Hungary's *Kiút* programme, which provided micro-loans to low-income groups (mainly from the Roma minority) to foster self-employment, also had a high rate of defaulted loans (around 54% on 31 October 2012).

The following approaches have been used to address those challenges (Table 2):

- Develop and deliver inclusive innovation programmes as part of broader development strategies. Programmes aimed at supporting laggards need to integrate from the beginning capacity building and other activities to tackle unfavourable conditions limiting the innovativeness of firms and/or regions.
- Where possible, tailor programmes to the capabilities of the target group. These adjustments, however, should not lead to a lowering of selection criteria that end up not supporting innovation (e.g. by funding ultimately non-innovation activities).
- Invest in capacity-building activities that include not only formal education but also coaching or mentoring to foster entrepreneurial skills.
- Invest in universal, high-quality basic scientific education. Such investments are crucial to enhance the innovation capacities of all individuals, regardless of their socio-economic background and geographical location, and therefore to ensure more inclusive societies. These effects are only evident in the long term.

4.4. Building the expertise for deploying the programmes

Limited expertise in building and deploying inclusive and STI-intensive projects sometimes hampers the effective implementation of programmes. For example, the implementation of the *Royalties for Science, Technology and Innovation* programme in Colombia 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.

Some programmes also face difficulties in attracting and retaining technical, financial and other experts and advisors with adequate skills to deploy the programmes on the ground, which might prevent their successful and timely implementation. For example, the *Productive Territories* programme in Mexico, which critically relies on experts to implement business plans, suffers from shortage of staff in regions. The *Kiút* programme also proved difficult to implement because of the wide range of skills required to field workers (as they were requested to act simultaneously as mentors, community workers and loan agents).

The following approaches have been used to address those challenges (Table 2):

- Have teams of experts assist regional authorities, to enhance their capacities to design and execute projects.
- Involve third parties in addition to regional authorities in the design of specific projects (e.g. research organisations and actors from departments other than where projects are to be executed).
- Set up a targeted recruitment process to select experts to deploy programmes on the ground, where conditions of everyday work are clearly specified – including the challenges that might have to be faced – to ensure that jobs are offered to the candidates that best fit the job requirements.
- Provide tailored training to experts, mentors, counsellors or advisors before implementing the programme, with the objective of reinforcing their capacity to face both expected and unexpected challenges.
- Recruit experts that belong to or have experience working with the target group and/or the region where the programme is being implemented. Such experts have a good knowledge of local conditions that might hinder adequate deployment of programmes and of how to address them, and are likely to be more committed to the objectives of the programme.
- Involve specialised intermediary institutions and use ICT solutions when an adequate number of experts cannot be accessed. The ICT solutions may include online databases maintained by central or regional bodies to register experts and online platforms. These may be especially useful in cases where local knowledge is less important than technical or industrial expertise.

Table 2. Implementation challenges of inclusive innovation policies: Recommended policy responses and examples

Challenge: Ensuring involvement in policy programmes by the target group	
Policy response	Examples
Design an outreach strategy that is tailored to the target group	- A marketing campaign targeting black researchers was designed for the most recent rounds of the <i>Thuthuka programme</i> in South Africa (which aims to award grants to researchers from historically disadvantaged groups), since it had previously failed to attract the preset target number of black applicants. The new marketing campaign, implemented prior to the start of new calls for proposals, identifies the institutions where potential candidates reside and tries to attract them with a communication mix consisting of direct communication (including via social media) with carefully targeted potential applicants, and face-to-face communication. Assistance during the application process is also offered to further promote participation, including support in research proposal writing, budget elaboration and research project management (NRF, 2014). - The <i>Awareness of the Right to Identity</i> project, implemented in Bolivia by the United Kingdom and Sweden, aimed at mitigating social exclusion of indigenous communities that do not own any documents of identification and therefore are hindered in their rights to access basic services. An efficient communication mix was used in the framework of the project to promote improved political and citizen participation of excluded indigenous people. It comprised mass media campaigns (both in Spanish and indigenous language); advocacy aimed at Congress and key decision makers; local fairs and expositions; forums for consultation and debate; and locally trained peer facilitators working in schools, peasant unions and women's organisations (OECD, 2012c). - In the <i>Euroagri Foodchain</i> programme, information days were organised and consultation services were offered to properly present the programme and reflect on doubts and comments of potential participants.
Engage the target group in the design and implementation of the programme	- The <i>Prototypes of Social Innovation</i> programme in Chile tries to identify local challenges through a process of co-ordination and collaboration among all regional actors; the process includes interviews and meetings with different social groups (including owners of small businesses, government employees, students, workers and social activists). A call for innovative solutions to those challenges is then issued on an online open innovation platform, where solutions can be publicly discussed and then submitted to the "Prototypes of Social Innovation" solution competition. - The <i>Ideas for Change</i> programme in Colombia allows vulnerable communities to identify their specific needs through a virtual platform, after which the STI community can propose specific solutions to their problems. - In Mexico, the <i>Productive Territories Programme</i> aims to reduce poverty through tailor-made development plans for poor rural communities. Technical expert teams elaborate and validate these plans in collaboration with the local communities, which ensures that the specific needs of the targeted community and the actual financial and technical opportunities are adequately identified. The plans count on local support for their implementation.
Communicate the objectives, activities and expected benefits of the programme to the targeted group by a member of the same community / social group	- The <i>Encouraging R&D in Traditional Industries</i> programme in Israel relied on the close collaboration with the Manufacturers Association of Israel (MAI), the representative body of all industrial sectors, to reach out to targeted firms and increase their engagement in the programme. - The <i>Support Programme for Companies from "Minorities sector"</i> in Israel relied on close collaboration with vibrant civil society organisations to reach potential entrepreneurs from minority groups, including through the organisation of workshops and orientation days. - The <i>Programme to Support Research Activities of Female Researchers</i> in Japan aims at increasing the number of women in research, organising meetings between female senior staff in research positions and high school and college female students. - To tackle mistrust against central government projects among the Roma population, the <i>Kiút</i> programme in Hungary employed social workers and other experts who informed the local stakeholders of the most important details of the project in their own environment.

Promote the interaction between the target group and the STI community and government actors	The <i>Ideas for Change</i> programme in Colombia invited vulnerable communities to identify specific needs that are affecting their quality of life through a virtual platform. Their challenges are passed on to the STI community (including universities, research groups and technological development centres), who through the same virtual platform propose different solutions that are creative and adaptable to low-cost technologies. Solutions are then selected in regional committees in which the communities with prioritised problems participate. This participatory and collaborative process fosters an atmosphere of trust, and ensures that implemented STI solutions have been accepted by all parties.
Provide information about the benefits of S&T, research and innovation	- The <i>Encouraging R&D in Traditional Industries</i> programme in Israel included providing traditional industry managers with training about the relevance and benefits of R&D processes (75% of which was funded by the government). - The <i>National Plan for Scientific Literacy</i> in China aims to strengthen S&T primary education and raise awareness about their benefits in people's lives.
Streamline and simplify administrative processes linked to the programme	In Israel, to ensure targeted groups do not feel discouraged from applying to the programme as a result of complex bureaucratic procedures, the time allowed for authorities to provide official responses to applications to the <i>Encouraging R&D in Traditional Industries</i> programme was shortened from 4.5 months to 10 weeks from submission of the request.

Challenge: Establishing selection criteria to reach the target group and support innovation activities	
Policy response	Examples
Establish selection criteria that go beyond skills and past performance, to value applicants' motivation and potential for success	The <i>Mature Entrepreneur</i> programme in Poland targeted unemployed or inactive individuals aged 50-64 who wanted to create a business. The programme introduced measures to select candidates with the highest chances of succeeding in their entrepreneurial venture. Applicants had to submit a written application, undergo an interview, and make a short oral presentation about their business ideas and motivations. Selected applicants were provided with 150 hours of training during which they developed their business plans. At the end of the training, only the most motivated and diligent participants with a feasible business plan got the one-time grant (OECD/EU, 2016).
Clearly define the scope of activities that could be supported and plan monitoring activities to confirm the effective implementation of programmes	The Science and Technology Entrepreneurship Development (STED) programme in India aims to enhance the development of lagging areas 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.
Establish criteria to select firms with the potential to become profitable businesses and create jobs	To be eligible to receive grants from the <i>Competitive Start Fund</i> in Ireland, companies must demonstrate that they are capable of creating ten jobs and realising sales of EUR 1 million within the following three years. Their application is then evaluated based, among other criteria, on their ability to deliver key commercial and technical milestones over the following twelve months, and on the expected impact of an investment of EUR 50 000 on the execution of their business plan.
Provide public support conditional on the participation of the private sector in financing the programmes	- The <i>Large companies' R&D Centres in the Periphery</i> programme in Israel provides grants to large firms, covering 65% to 75% of the expenses of R&D centres created in peripheral regions for 24 to 36 months. - The <i>Competitive Feasibility Fund for Women Entrepreneurs</i> in Ireland provides grants to fund feasibility studies covering up to 50% of eligible expenditures, up to a maximum of EUR 25 000.
Involve third party organisations and experts in designing the programme structure	- In the context of the European Union's Framework Programmes for Research and Innovation aimed at SMEs (industrial inclusiveness) or <i>regional programmes</i> aimed at lagging regions (territorial inclusiveness), the European Commission and national bodies organise local workshops and develop online questionnaires for potential target groups in order to be able to design the most effective innovation initiatives. - The Italian region of Piedmont has improved the bottom-up identification of innovation policy priorities by promoting sustained dialogue among various innovation stakeholders (such as the regional executive council, representatives from the most innovative companies in the region, employer associations and trade unions, regional universities, research organisations, etc.) (OECD, 2009b).
Use equity investment as an alternative to loans/grants when appropriate	- In China, the <i>Innovation Fund</i> to support enhancement of the innovation capacities of local SME includes equity investments among its policy instruments (World Bank, 2013b). - Enterprise Ireland also provides equity financing to innovative start-ups, for instance through the <i>Competitive Start Fund for start-ups in the design sector</i>.

Challenge: Building capabilities among target groups to undertake activities promoted by the programme	
Policy response	Examples
Develop and deliver inclusive innovation programmes as part of broader development strategies	In order to tackle the unfavourable general conditions that might hold back successful implementation of the <i>Special Economic Zones Programme</i> in targeted regions in Mexico, and to ensure that local residents and firms benefit from it, the programme foresees the design and implementation of other policies improving the human capital endowment through education, the improvement of health services, the expansion of financial services, and the development of public infrastructure.
Tailor programmes to the capabilities of the target group	- In Mexico the <i>Productive Territories Programme</i> aims at reducing poverty through tailor-made development plans for poor rural communities. Teams of technical experts elaborate and validate these plans in collaboration with the local communities, which ensures that the specific needs of the targeted community and the actual financial and technical opportunities are adequately identified. - In India, implementing agencies of the <i>Science and Technology Entrepreneurship Development</i> programme analyse the target region's potential and identify 3-4 technology areas of specific relevance. Potential entrepreneurs are then identified, trained and provided with support to launch their micro-enterprises in those sectors.
Invest in capacity-building activities	- The <i>SME Instrument</i> of the EU's Horizon 2020 framework programme not only provides a grant to SMEs planning to undertake an innovative project, but also supports them with coaching services for up to 15 days, which may include assistance in business development (e.g. analysis of potential business opportunities, development of a marketing plan), organisation (e.g. mobilisation of the SME's human and financial capital) and co-operation (e.g. planning innovation partnerships) (EC, 2016). - The <i>Spark Programme</i> in China promoted innovation among rural populations with the provision of technology training to farmers and rural entrepreneurs.
Invest in universal, high-quality basic scientific education	China has launched the National Action Plan for Scientific Literacy, which aims to improve the national scientific literacy needed for inclusive innovation, by investing in education – in particular basic education in underdeveloped regions – and popularising science and technology

Challenge: Building adequate expertise of public sector officials and experts deploying the programmes	
Policy response	Examples
Provide expert assistance to regional authorities to enhance their capacities to design proposals and execute projects	The <i>Royalties for Science, Technology and Innovation</i> programme in Colombia created teams of experts to provide assistance on the ground to regional governments (<i>gobernaciones</i>) with lack of previous experience in building STI-intensive projects. The teams help them structure proposals (which have to 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.
Involve third parties in addition to regional authorities in the design of project proposals	The <i>Royalties for Science, Technology and Innovation</i> programme in Colombia also 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.
Set up a targeted recruitment process to select experts to deploy programmes	The <i>Productive Territories Programme</i> in Mexico has introduced changes in the selection process of experts to deploy the programme on the ground. In particular, the programme establishes that the conditions of everyday work are clear to the applicants, including the challenges that might have to be faced, so as to ensure that jobs are offered to the candidates that best fit the job requirements.
Provide tailored training to experts, mentors, counsellors or advisors before the start of the programme	- The <i>Kiút programme</i> in Hungary introduced training courses for field workers, as often these social workers were well-prepared but had few business development skills (e.g. legal and financial knowledge), crucial to assist the target group in developing their business activity. - The <i>Step by Step to the Labour Market</i> programme, implemented in Vukovar (Croatia), promoted self-employment among disadvantaged women through the provision of psychological counselling, as well as ICT and entrepreneurship workshops. To ensure that workshop trainers were fully prepared for the specific needs and interests of the target group, they had to undertake a number of training courses provided by the employment service (OECD/EU, 2016).
Recruit experts that belong to or have experience working with the target group and/or in the target region	The <i>Ethnic Coach for Ethnic Minority Entrepreneurs</i> programme, in Denmark, enlists the help of ethnic minority and immigrant entrepreneurs as coaches, in order to assist people from the same ethnic community in starting their own businesses. These coaches provide professional advice related to regulatory and social norms, business plan development, available funding sources and personal skills development (OECD/European Commission, 2013).
Involve specialised intermediary institutions and use ICT solutions when an adequate number of experts cannot be accessed	- In the framework of the <i>Euroagri Foodchain</i> programme, all project applications must be assessed by evaluators that are experts in the fields related to the project. Since the objective of the programme is to develop multi-disciplinary, cross-sectional projects, there is a shortage of appropriate project evaluators at a local level. Therefore a dedicated expert database was developed for identifying appropriate experts who can evaluate new project proposals from the scientific, innovative, financial and business points of view. - The <i>Honey Bee Network</i> in India, a not-for-profit organisation that developed an extensive database of inclusive innovations and aims to diffuse this vast knowledge by, among other means, connecting grassroots innovators with scientists and engineers possessing the necessary expertise.

Notes

1. www.oecd.org/inclusive-growth/.
2. An interactive policy toolkit containing examples of policies from different countries that address territorial, industrial and social inclusiveness challenges has been developed and is available in the OECD-World Bank Innovation Policy Platform (<https://www.innovationpolicyplatform.org/inclusivetoolkit>)
3. The countries in question are Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Italy, Korea, Luxembourg, the Netherlands, Norway, Portugal, the Slovak Republic, Spain, the United Kingdom and the United States. In the case of the United Kingdom, the geographical coverage of the data is limited to Great Britain (excluding Northern Ireland).
4. More broadly, social inclusion is frequently defined as both the process and the outcome of efforts to ensure that all individuals and segments of the population, regardless of their socio-economic background, gender, age, ethnic origin, religion, place of residence or disability status, have equal opportunities to contribute to and benefit from economic prosperity; have a voice in decisions that affect their lives; and have the opportunity to fully and actively participate in the political, social and cultural spheres of society.
5. A full overview of the barriers to innovation faced by SMEs can be found on the Innovative Entrepreneurship module of the Innovation Policy Platform (<https://www.innovationpolicyplatform.org/content/innovative-entrepreneurship>).
6. More information on access to foreign and domestic barriers and how it affects innovative businesses can be found here: <https://www.innovationpolicyplatform.org/content/access-foreign-and-domestic-markets> . For more insights on barriers to SMEs' access to international markets, see OECD (2008) and OECD (2009a). A glossary of barriers can also be found here: <http://www.oecd.org/cfe/smes/glossaryforbarrierstosmeaccessointernationalmarkets.htm>
7. The OECD publication “Innovation Policies for Inclusive Growth”, published in 2015, focuses specifically on analysing the contributions of “inclusive innovations”, i.e. innovations that serve the welfare of lower-income and excluded groups. It explores the obstacles and market failures they face, the factors that facilitate their scaling up, as well as how innovation policies can support such innovations. For more details, see OECD (2015f).
8. Hsieh and Klenow (2009), measuring across-firm misallocation in manufacturing sectors in China and India, found that there is a sizeable misallocation relative to the United States, and that removing it would increase the total factor productivity (TFP) by 30-50% in China and 40-60% in India. Busso, Madrigal and Pagés (2010) quantified the potential gains in TFP that can be achieved by reallocating resources more efficiently across firms in Latin American countries, and concluded that reallocation of capital and labour would raise aggregate TFP in the region between 40% and 120%, depending on the time frame and countries. Other consequences of such misallocations may include labour market distortions (e.g. a large-sized informal economy), firm-level challenges in recruiting staff with appropriate skills, and high gender inequalities (OECD, 2016b). All of these are visible in Latin America. Estimates show that nearly 55% of workers in the region are informal (Bosch, Melguizo and Pagés, 2013), and more than 35% of firms in most countries report difficulties recruiting adequately skilled labour, significantly above rates in other emerging regions such as East Asia and Pacific, Eastern Europe and Central Asia. Furthermore, the average labour force participation rate for women in the region is 56% compared to 83% for men (OECD/ECLAC/CAF, 2015).
9. Australia, Canada, the Czech Republic, Denmark, Finland, Germany, Israel, the Netherlands, Poland, Sweden, Switzerland, the United Kingdom and the United States.

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Annex A. Toolkit on innovation policies for inclusiveness**Table A.1. Overview of policy cases***

Ideas for Change – Colombia 2012-14 – Social inclusiveness			
<i>Rationale:</i> Various communities live in conditions of extreme poverty and vulnerability.	<i>Objective:</i> Find solutions to challenges faced by poor and vulnerable communities, particularly in the environment and energy fields.	<i>Target:</i> Poor and vulnerable local communities with unmet needs, particularly relating to the environment and energy fields.	<i>Instrument:</i> Grants provided to firms, universities and research institutions that can solve identified local challenges in the environment and energy fields. Such challenges are previously identified in consultation with local communities.
Initiative for start-ups and business transfer – Germany (Federal State of Baden-Württemberg) 2012-present – Social inclusiveness			
<i>Rationale:</i> The firms of immigrant entrepreneurs face higher exit rates than those from non-immigrant entrepreneurs.	<i>Objective:</i> Foster immigrants' entrepreneurship and their business success.	<i>Target:</i> Immigrant population (actual and potential entrepreneurs).	<i>Instruments:</i> Public awareness campaigns, including through information web pages and seminars; financial support for training and counselling initiatives for immigrant entrepreneurs provided by business chambers and other organisations.
Support programmes for companies from the ultra-Orthodox community and from minority communities – Israel 2014-present – Social inclusiveness			
<i>Rationale:</i> Israel is a world leader in high-tech and technological innovation, but some communities are generally not involved in such activities.	<i>Objective:</i> Encourage and support entrepreneurship by the ultra-Orthodox community and the Arab minorities.	<i>Target:</i> Minority groups (ultra-Orthodox entrepreneurs and Arab entrepreneurs – including Druze, Bedouin and Circassians).	<i>Instrument:</i> Grants covering 85% of the approved budget, up to NIS 2 million (EUR 478 000), notably for start-ups' product development.
Programme to support the research activities of female researchers – Japan 2006-present – Social inclusiveness			
<i>Rationale:</i> The share of women researchers in Japan is very low, particularly in the fields of science and engineering. Few are in leading positions.	<i>Objective:</i> Increase the number of women in leading positions in research, particularly in science, technology, engineering and mathematics (STEM).	<i>Target:</i> Women researchers.	<i>Instrument:</i> Funds to research organisations to develop and implement measures aimed at improving the research environment for women researchers; awareness-raising activities in high schools and colleges to encourage women to take up careers in STEM disciplines.

Centre for Women in Science, Engineering and Technology, Korea 2001- present – Social inclusiveness			
<i>Rationale:</i> Women's participation in R&D activities in STEM fields is low in Korea. Female scientists and engineers hold fewer permanent and fewer management positions than men.	<i>Objective:</i> Foster women's participation in science, engineering and technology research and industry	<i>Target:</i> Women at different stages in their careers in STEM fields.	<i>Instrument:</i> Grants to support engineering research projects led by female graduate students; support for female researchers returning to R&D activities after a career break (e.g. due to maternity); and mentoring programmes for young women in high school.
Social problem-solving R&D project, Korea 2001-present – Social, territorial and industrial inclusiveness			
<i>Rationale:</i> Social problems (e.g. socio-economic polarisation, ageing population, climate change) need to be addressed and research can contribute.	<i>Objective:</i> Solve social problems by strengthening public participation in the processes of R&D projects.	<i>Target:</i> Citizens, local communities, corporations, public institutions and social service organisations	<i>Instrument:</i> Identify social problems through feedback from the public and provide financial and non-financial support to researchers and experts to address those challenges.
European Progress Microfinance Facility Programme – Lithuania 2007-13 – Social inclusiveness			
<i>Rationale:</i> Women entrepreneurs in Lithuania have little access to financial services.	<i>Objective:</i> Foster women's entrepreneurship by facilitating their access to financial services.	<i>Target:</i> Self-employed women or micro-enterprises and SMEs either owned by women or employing a majority of women.	<i>Instrument:</i> Micro-loans (with favourable conditions on credit provision and repayment).
Maori Innovation Fund (Te Pūnaha Hīringa) – New Zealand 2014-present – Social and industrial inclusiveness			
<i>Rationale:</i> Maori enterprises are frequently not engaged in the innovation system, and suffer from low productivity.	<i>Objective:</i> Help Maori collectives to increase their skills, knowledge and networks so they can realise the economic potential of their assets.	<i>Target:</i> Maori collectives, including trusts, incorporations, post-settlement governance entities and similar organisations.	<i>Instrument:</i> Financial support to contract a commercial advisor to provide professional business advice and mentoring; training in governance, management, strategic planning and other business skills.
Thuthuka programme – South Africa 2001-present – Social inclusiveness			
<i>Rationale:</i> Researchers from disadvantaged groups are underrepresented in terms of the positions that they hold and in accessing funding in the national research sector.	<i>Objective:</i> Develop human capital and improve the research capacities of researchers from underrepresented groups.	<i>Target:</i> Researchers from disadvantaged groups, particularly women and black people.	<i>Instrument:</i> Grants for research projects proposed by researchers from disadvantaged groups.

**Competitive Feasibility Fund for Female Entrepreneurs Programme – Ireland
2012-14 – Social and industrial inclusiveness**

Rationale: Entrepreneurs frequently lack the necessary financial resources to investigate the viability of an innovative business idea. Few female-led start-ups have grown successfully.

Objective: Assist female-led new start-up companies and female entrepreneurs in investigating the viability of innovative business propositions with a high potential for exporting.

Target: Women entrepreneurs.

Instrument: Grant for funding the proposed feasibility study, covering up to 50% of eligible expenditures with a maximum of EUR 25 000.

**Competitive Start Fund for Female Entrepreneurs Programme - Ireland
2012-present – Social and industrial inclusiveness**

Rationale: Start-ups frequently lack the necessary financial resources to launch new products internationally. Few female-led start-ups have grown successfully.

Objective: Provide female-led start-ups with critical early-stage funding to reach key commercial and technical milestones and launch new products internationally.

Target: Women entrepreneurs.

Instrument: Equity investment of up to EUR 50 000 for a 10% shareholding in the company for costs of developing a business plan and making progress on key technical and commercial milestones, and non-financial support (counselling from a mentor).

**National Action Plan for Scientific Literacy – China
2006-2020 – Social inclusiveness**

Rationale: Scientific literacy among the general population (particularly among the poor in lagging areas) is low. This hinders economic development and innovation performance.

Objective: To increase general scientific literacy in the country, with the objective of providing every adult citizen with basic scientific literacy by 2050.

Target: All citizens, with the focus on disadvantaged populations from underdeveloped regions.

Instrument: Investment in compulsory public education with a focus on science across the country; investment in education infrastructure (e.g. S&T museums), particularly in lagging areas; organisation of popular science activities (e.g. National S&T week).

**Kiút programme – Hungary
2010-12 – Social inclusiveness**

Rationale: Poor people, especially the Roma minority, are frequently not part of the formal economy.

Objective: Enable poor people to establish their own business, with the objective of integrating them in local production systems.

Target: People around or below official poverty line, with a specific focus on the Roma minority, people living in lagging regions and women.

Instrument: Micro-loans and non-financial support (e.g. administrative help, training on financial and business issues).

Productive Territories Programme – Mexico**Pilot phase – Social inclusiveness**

Rationale: Rural poverty in Mexico is severe due to a lack of productive businesses and corresponding employment opportunities.

Objective: Reduce poverty and increase 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.

Target: Poor rural households (to be eligible, households need to be beneficiaries of the social programme Prospera and live in rural municipalities).

Instrument: A technical team develops a tailored development plan for each location, taking into account 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.

H2020 SME Innovation Associate – EU Member Countries and other countries associated with Horizon 2020**2016-18 (Pilot phase) – Industrial inclusiveness**

Rationale: European SMEs have difficulties accessing the skills and knowledge needed to manage and implement in-house innovation processes in their national context.

Objective: Support SMEs in recruiting highly skilled researchers from other countries in order to turn their innovative idea into a viable project.

Target: SMEs and start-ups with innovative ideas.

Instrument: Grant to cover costs of employing a researcher for up to one year (including salary, travel expenses and others); training package to maximise research outcomes and impact for both the SME and the researcher.

Innovation vouchers programme – Hungary**2016-18 – Industrial inclusiveness**

Rationale: Micro-enterprises and SMEs frequently lack the necessary funding and in-house expertise to innovate.

Objective: Support SMEs innovation performance by helping them to connect with universities and research institutions to support their innovation projects.

Target: Micro, small and medium enterprises (MSMEs) seeking to develop an innovative product, service or process.

Instrument: Non-repayable grants to finance innovation consultancy or innovation support services provided by universities and public research institutes.

Innovation vouchers programme for the design sector – Ireland 2015 – Industrial inclusiveness			
<i>Rationale:</i> The majority of small businesses in the design sector do not have the scale or the resources necessary to engage in in-house research while also lacking links to outside research sources that could furnish relevant knowledge.	<i>Objective:</i> Assist SMEs in gaining the knowledge needed to explore a targeted business opportunity, sourced from higher education institutes and public research bodies.	<i>Target:</i> SMEs in the design sector.	<i>Instrument:</i> Innovation voucher for SMEs to explore a business opportunity or solve a problem with the assistance of a registered public knowledge provider. Two types of vouchers, each worth EUR 5 000: 1) standard vouchers; 2) co-funded fast track vouchers, which require the company to contribute 50% of the project costs.
Competitive Start Fund for the design sector – Ireland 2015-present – Industrial inclusiveness			
<i>Rationale:</i> Start-ups in the design sector frequently lack the necessary resources to reach key commercial and technical milestones.	<i>Objective:</i> Provide young companies in the design sector with critical early-stage funding to help them reach key commercial and technical milestones and launch new products and services in the international marketplace.	<i>Target:</i> SMEs in the design sector.	<i>Instrument:</i> Equity investment of up to EUR 50 000 for a 10% shareholding in the company. Investment to support costs of developing a business plan, building prototypes, building foreign market entry plans and/or securing third party investment. Firms also receive technical support.
Encouraging R&D in traditional industries – Israel 2005-present – Industrial inclusiveness			
<i>Rationale:</i> Traditional industries in Israel suffer from low productivity. In general they are low-tech, and their engagement in innovation activities is much lower than for traditional industries in the United States or Europe.	<i>Objective:</i> Encourage traditional industries to invest in R&D, for the country to reach 80% of the labour productivity of traditional industries in the United States and cater to the local market.	<i>Target:</i> Traditional industries as defined by the Israel Central Bureau of Statistics (including mining, rubber and plastic, food, beverages and tobacco, textile, leather products, paper, wood products).	<i>Instrument:</i> Grant of 50% from the approved budget for the R&D project and provision of professional counselling services.
Centers for Creative Economy and Innovation – Korea 2014-present – Industrial and territorial inclusiveness			
<i>Rationale:</i> In Korea, there are large gaps in innovation capacities across regions (capital area versus the rest of the country) and firms (large firms and conglomerates versus SMEs and start-ups).	<i>Objective:</i> Promote business start-ups and innovation by small and medium-sized companies, and build conditions for innovation in different cities and provinces across the country.	<i>Target:</i> Small and medium-sized enterprises, and potential start-ups.	<i>Instrument:</i> Business consultation services for start-ups; creation of networks including SMEs and innovation actors; assistance in (among others) R&D and marketing.

Commission for Corporate Partnership, Korea 2010-present – Industrial inclusiveness			
<i>Rationale:</i> The productivity gap between large enterprises and SMEs is large in Korea.	<i>Objective:</i> Improve the relationship between large enterprises and SMEs, reduce social polarisation, and strengthen national competitiveness.	<i>Target:</i> SMEs and large enterprises.	<i>Instrument:</i> Identification and dissemination of successful win-win growth models, and of best practices for corporate partnership. Identification of types of activities that are suitable for SMEs.
EuroAgri Foodchain 2014-18 – Industrial inclusiveness			
<i>Rationale:</i> The European agri-food sector may gain in competitiveness if it engages more in international R&D co-operation, currently low in the industry.	<i>Objective:</i> Increase the competitiveness and innovativeness of the European agri-food industry by supporting R&D projects in one of the members of EUREKA, an open platform for international co-operation in innovation.**	<i>Target:</i> SMEs, large companies, research institutions and universities in the agri-food sectors that intend to introduce an innovation.	<i>Instrument:</i> Support varies depending on the case; it can include the provision of grants as well as advisory services, and promotion of products and technologies across countries.
Innovation Fund for SMEs – China 1999-present – Industrial inclusiveness			
<i>Rationale:</i> Lack of finance restrains the development of SMEs; government intervention could act as a catalyst for more private investments by signalling the potential of these sectors.	<i>Objective:</i> Enhance the S&T and innovation capabilities of SMEs.	<i>Target:</i> SMEs nation-wide.	<i>Instrument:</i> Financial support (grants, loan interest subsidies for new product development and pilot production, and equity investments); and advisory services.
Large companies' R&D Centres in Israel's Periphery programme – Israel 2010-present – Territorial inclusiveness			
<i>Rationale:</i> Central Israel has high income and is home to many technology-based industries while peripheral regions have low income and weakly innovative sectors.	<i>Objective:</i> Encourage large companies to establish R&D centres in lagging regions in order to narrow the gap with Central Israel.	<i>Target:</i> Large leading R&D-investing companies.	<i>Instrument:</i> Grant covering 65-75% of the R&D expenses of R&D centres created in peripheral regions for 24-36 months. Larger companies are required to repay the grants at a rate of 3% of the grant value per year on successful projects
Technoparks – Korea 1997-present – Territorial inclusiveness			
<i>Rationale:</i> Innovation activities are mainly concentrated around Seoul, while most other regions lag behind in terms of their	<i>Objective:</i> Provide infrastructures and managerial and technical support to firms located in peripheral regions to reduce the	<i>Target:</i> Peripheral regions.	<i>Instrument:</i> Development of technology parks (eighteen are currently in operation). Among other instruments, this involves provision of infrastructure (e.g. incubators)

innovation capacities.	gap between the Seoul area and others.		and R&D funding to R&D centres; support to develop human capital in strategic regional industries; and incentives for joint R&D and funding to firms (e.g. credit for tech-based R&D, venture and seed capital).
Special Economic Zones – Mexico 2016-present – Territorial inclusiveness			
<i>Rationale:</i> 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).	<i>Objective:</i> Foster economic development in three lagging regions in the south of Mexico, so as to address the gap between north and 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.	<i>Target:</i> Peripheral regions (three lagging regions in southern Mexico).	<i>Instrument:</i> Establish of four special economic zones in which firms investing and creating jobs 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).
Experimental Program to Stimulate Competitive Research – United States 1980-present – Territorial inclusiveness			
<i>Rationale:</i> Uneven geographical concentration of research, development and innovation activities.	<i>Objective:</i> Assist jurisdictions that have historically received little federal R&D funding in developing and strengthening their research capabilities, and improve STEM research and education programmes at their universities/colleges.	<i>Target:</i> Jurisdictions (states or territories) that have received little support for research over the past three years (equal to or less than 0.75% of the total NSF Research and Related Activities budget).	<i>Instrument:</i> Federal awards co-financed by individual jurisdictions (states or territories).
Spark Programme – China 1986-2015 – Territorial inclusiveness			
<i>Rationale:</i> 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.	<i>Objective:</i> Enhance the innovation performance of the rural economy through science and technology and popularise science and technology in rural areas.	<i>Target:</i> Rural areas.	<i>Instrument:</i> Technology training to improve the skills of farmers and rural entrepreneurs; management training; support to projects that use S&T and know-how from research institutes to solve local technology programmes, including technical demonstrations, product design and development of quality control techniques.

Prototypes of Social Innovation programme –Chile			
2014-present – Social inclusiveness			
<i>Rationale:</i> Innovation and new technologies offer opportunities to solve social challenges, but those with the capacity to develop solutions often do not know the specific challenges communities face.	<i>Objective:</i> Develop proofs of concept and prototypes of innovative solutions to meet social/regional challenges through open innovation.	<i>Target:</i> Regions and communities facing specific social challenges.	<i>Instrument:</i> Grants 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.
Royalties for Science, Technology and Innovation programme – Colombia			
2012-present – Territorial inclusiveness			
<i>Rationale:</i> Regional inequalities are sizeable including in innovation performance.	<i>Objective:</i> Increasing the scientific, technological, innovation and competitiveness capacities of regions.	<i>Target:</i> Regions with weak innovation performance.	<i>Instrument:</i> Fund to support regional STI activities that contribute to the production, use and absorption of knowledge by industry and society.
Envoy System – China			
2002-present – Territorial inclusiveness			
<i>Rationale:</i> 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.	<i>Objective:</i> Allow for more innovation among rural populations by dispatching S&T specialists to the countryside and promoting innovative entrepreneurship in the rural areas.	<i>Target:</i> Farmers in rural areas.	<i>Instrument:</i> Qualified S&T specialists provide farmers with S&T services, including demonstrations of new technologies, training and personalised consulting.
Science and Technology Entrepreneurship Development - India			
Initially launched in 1985 and reformulated in 1996-97–present – Territorial inclusiveness			
<i>Rationale:</i> Less developed regions have large numbers of unemployed youth with the potential to launch micro-enterprises, but lacking the capabilities and opportunities to build such enterprises.	<i>Objective:</i> The programme aims to promote the development of lagging areas by supporting micro-enterprises.	<i>Target:</i> Micro-entrepreneurs in lagging regions.	<i>Instrument:</i> Financial support is provided to selected implementing agencies (educational or research institutions, government or non-government agencies with experience in promoting micro-entrepreneurship) for 4 years. The agencies analyse the region's potential and identify 3-4 technology areas of relevance. Potential entrepreneurs are then identified, trained and provided with support.

* The OECD's Inclusive Innovation Policy Toolkit available in the OECD-World Bank Innovation Policy Platform provides detailed information about the policy cases presented in this table (<https://www.innovationpolicyplatform.org/inclusivetoolkit>).

** Eureka has 41 member countries, www.eurekanetwork.org/content/which-countries-are-eureka-members.