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Mining Regions and their Cities

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MINING REGIONS AND THEIR CITIES

The purpose of this paper is to inform the first OECD meeting on mining regions by identifying the main policy issues for regions with a specialisation in mining and extractive activities. It begins with an overview of the OECD approach to regional and rural development including some of the key development trends for natural resource based regions. The key challenges facing regions and their cities with a specialisation in mining and extractive activities - competitiveness and productive diversification, quality of life and wellbeing, and governance - are then introduced and discussed further. The paper concludes with some next steps including outlining a framework to identify better policy solutions for mining regions and their cities that can guide future OECD work on this topic.

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1. Introduction

The sub-national dimension is critical to understanding how to deliver better policies for economies that are specialised in mining and extractive activities. This specialisation generates unique opportunities (investment and technological innovation, high wage jobs, participation in global value chains) and challenges (dutch disease, vulnerability to external shocks, and environmental impacts). These impacts, particularly the costs and negative externalities, are amplified at the regional and local scale where mining and extractive operations take place. Successfully navigating the unique challenges facing mining regions and their cities requires the implementation of regional development policies that: (i) enable productivity growth and diversification leading to higher value economic activities; (ii) improve local quality of life and proactively address inequality and social license issues; and, (iii) develop mechanisms to enhance cooperation across levels of government and support high quality public investment decision making. The purpose of this paper is to inform the first OECD meeting on mining regions by identifying the main policy issues for regions with a specialisation in mining and extractive activities. The paper begins with an overview of the OECD approach to regional and rural development including some of the key development trends for natural resource based regions. The key challenges facing regions and their cities with a specialisation in mining and extractive activities - competitiveness and productive diversification, quality of life and wellbeing, and governance - are then introduced and discussed further. The paper concludes with some next steps including outlining a framework to identify better policy solutions for mining regions and their cities that can guide future OECD work on this topic.

1.1 OECD approach to regional urban, and rural development policies

There is recognition that persistent and increasing inequalities within and between regions, cities and rural areas result in under-used economic potential and weakened social cohesion. The OECD has developed a programme of work with countries that identifies a set of principles and good practices to address this challenge. The OECD promotes place-based policies that have the following features:

- Use of **regional specific assets** (or create absolute advantages to stimulate competition and experimentation across regions);
- Create **complementarities** among sector policies at the regional (or local) level; and,
- Use of **multi-level governance mechanisms** for aligning objectives and implementation.

This section of the paper outlines why this approach is important in relation to the challenges faced by mining regions and their cities.

Regional (with country) inequalities are increasing and this presents “un-tapped” opportunities for growth.

Across the OECD countries have sub-national regions that strongly differ in their performance and growth rates (OECD 2016). These differences persist over time suggesting that regional level factors yield significant differences in productivity and consequently income levels among regions (Garcilazo and Martins 2013). Although a small number of large cities contribute disproportionately to growth there are many smaller and lagging regions that also make important contributions to national growth. A decomposition of the latter in OECD shows that between 1995 and 2007, less developed regions had a vital contribution to aggregate growth, since they accounted for 43% of aggregate OECD growth. There is also significant potential for “catching up” whereby lagging regions can copy, imitate or import existing technologies (OECD 2016). OECD work on regional growth has shown that there is potential for growth in all regions, and that the determinants of growth can be addressed by public policies (OECD, 2011, 2016).

The barriers to growth that regions must overcome vary widely across regions and levels of development. The OECD has developed a taxonomy of regions based on their performance against national averages, and then against both national and OECD averages to identify those with large catching-up potential, regions with catching-up potential and advanced regions (OECD 2009, 2012). For regions with large catching-up potential convergence is important but catching-up can be accelerated by interventions that address issues at the bottom of the skill distribution and build local institutional capacities. For advanced regions innovation is a much more importance factor for growth (since they are at the productivity frontier). Recent analysis has also shown that proximity to cities and the tradeable sector are important factors in promoting catching-up dynamics (OECD 2016). Tradeable sectors (such as agriculture, industry, financial and insurance services) are more exposed to international competition and therefore have greater opportunity to catch up to the productivity frontier. This is a key feature and advantage for regions which have a specialisation in mining and extractive activities.


There are important differences in growth dynamics between urban and rural areas

Mining regions cover places that have urban and rural characteristics. OECD analysis shows that urban and rural areas have different growth dynamics. Three quarters of the most productive regions across the OECD are mostly urban regions with most of these containing a large metropolitan area (with a population over 500,000 people) (OECD 2016). Productivity growth in urban areas benefit from agglomeration economies, which emerge due to three reasons: (i) sharing of facilities, inputs and gains from specialisation which lead to lower costs; (ii) thicker labour markets arising due to labour pooling and better matching; and, (iii) knowledge spillovers as density increases the intensity of interactions (Rosenthal and Strange, 2004, Duranton and Puga, 2004, and Puga 2004). These dynamics are becoming increasingly important in the service sector particularly in knowledge-intensive activities. Smaller cities and rural towns can “borrow” these agglomeration effects by being more closely connected to other cities (Ahrend and Schumann 2014, Meijers and Burger 2017). However, low density or rural economies, particularly those in remote areas, have a different development logic that poses unique challenges and opportunities. These regions face challenges such as long supply chains, an ageing workforce, and weak local competition. Growth can be driven by mobilising endogenous assets and is also strongly influenced by exogenous factors with participation in GVCs usually related to a narrow range of goods and services linked to natural resources and assets (OECD 2016).

Regional policies can complement structural policies to address these issues

Successful performance therefore requires more than uniform economy-wide policies: a place-based approach is needed (OECD 2016). Over past decades there has been shift in how OECD countries approach regional and rural development policies. In the past, these policies tended to focus on addressing disparities between regions through the provision of subsidies to compensate them for lower incomes. Policies were designed by central governments through departments of state that delivered narrowly defined programs with support for individual firms, incentives for inward investment, and a focus on infrastructure investment. Over time this approach has been seen as increasingly ineffective and not sustainable from a fiscal point of view. The new approach to regional policies emphasise a focus on competitiveness and working with regions to unlock growth potential based on their unique assets and local conditions (across policy areas influencing human capital development, innovation, and infrastructure) (Figure 1). This integrated approach has significant implications for how government works. Different levels of government need to work in a more integrated way at a regional and local level. Within this framework the specific policy responses for urban and rural areas are different, and aim to develop complementarities between them.

Table 1. The paradigm shift in regional policy

	Traditional regional policies	New paradigm
Objectives	Balancing economic performance by temporary compensation for regional disparities	Tapping underutilised regional potential for competitiveness
Strategies	Sectoral approach	Integrated development projects
Tools	Subsidies and state aid	Soft and hard infrastructure
Actors	Central government	Different levels of government
Unit of analysis	Administrative regions	Functional regions
	 Redistributing from leading to lagging regions	Building competitive regions to bring together actors and targeting key local assets

Source: OECD (2009b), *Regions Matter: Economic Recovery, Innovation and Sustainable Growth*, <http://dx.doi.org/10.1787/9789264076525-en>.

Urban policies are important for mining regions, particularly in terms of developing the quality of life to retain and attract skilled labour that can contribute to increased productivity and diversification within a regional economy. Key issues for mining cities can include facilitating the supply of quality housing choices in the context of fast population growth, and managing conflicts between residential and industrial land uses. Urban policies tend to focus on the mitigation of costs associated with growth such as traffic congestion, pollution, and socio-economic inequalities. The physical form of cities and the organisation of land use have an important impact on these outcomes and can be influenced by policies through different policy instruments including land use regulation, infrastructure investment, and taxation arrangements (OECD 2017). Urban policies are more effective if they are designed at the scale of functional urban areas (FUA) (urban cores and travel-to-work flows which indicate a high level of economic integration) rather than administrative boundaries. There is also a “productivity penalty” associated with a higher number of local government areas within an FUA. Reforms which reduce administrative fragmentation and strengthen horizontal and vertical coordination (including with surrounding rural areas) are also important in improving urban economic performance (OECD 2016).

Rural development policies share some similarities but have a different focus than urban policies. A key focus for rural development policies is how to overcome the challenge of distance and low densities, grow external markets, and diversify locally produced goods and services. This can be achieved through “bottom-up” economic development strategies that focus on regional competitive advantages and open up opportunities for related diversification and participation in global value chains (GVCs) (OECD 2016). There is no single policy recipe for achieving this outcome but policies tend to share the following characteristics: identification of absolute advantages supported by an evidence-base, working with entrepreneurs to identify bottlenecks/market failures associated with them, an emphasis on building networks, and investing in platforms to promote technology transfer. Rural development policies also require an integrated approach to investment across levels of government, and a focus on empowering rural communities to participate in decision-making through community capacity building (OECD 2016). Urban and rural areas also mutually benefit from strengthening linkages such as demographic (population movements, human capital, commuting), economic (e.g. local supply-chain linkages), the delivery of public services, and exchanges in amenities and environmental goods (OECD 2013a). These elements are captured by the OECD Rural Policy 3.0.

Table 2. Rural Policy 3.0

	Old Paradigm	New Rural Paradigm (2006)	Rural Policy 3.0 –Implementing the New Rural Paradigm
Objectives	Equalisation	Competitiveness	Well-being considering multiple dimensions of: i) the economy, ii) society and iii) the environment
Policy focus	Support for a single dominant resource sector	Support for multiple sectors based on their competitiveness	Low-density economies differentiated by type of rural area
Tools	Subsidies for firms	Investments in qualified firms and communities	Integrated rural development approach – spectrum of support to public sector, firms and third sector
Key actors & stakeholders	Farm organisations and national governments	All levels of government and all relevant departments plus local stakeholders	Involvement of: i) public sector – multi-level governance, ii) private sector – for-profit firms and social enterprise, and iii) third sector – non-governmental organisations and civil society
Policy approach	Uniformly applied top down policy	Bottom-up policy, local strategies	Integrated approach with multiple policy domains
Rural definition	Not urban	Rural as a variety of distinct types of place	Three types of rural: i) within a functional urban area, ii) close to a functional urban area, and iii) far from a functional urban area

Source: OECD (2016)

1.2 Key challenges facing resource based economies at a national and regional level

At the country level, natural resource-based economies are often (although somewhat arbitrarily) defined as economies in which natural resources account for more than 10% of GDP and 40% of exports (Ahrend 2006). There a number of OECD countries which specialise in natural resource based activities (mining and extraction, agriculture, and forestry) such as Canada, Australia, Finland, Sweden and Norway. A large number of low and middle income countries also have a heavy bias toward natural resources. Mining and extractive industries have particular effects because of the relative volatility in prices over time, and the levels of investment required in order to take advantage of new market opportunities. These effects play out at a national and regional level.

Effects at a national level – dutch disease, fiscal impacts, and political economy challenges

Specialisation in natural resource activities can influence a country's terms of trade, which refers to the ratio of export to import prices. Rising commodity prices can result in increased investment and improved terms of trade which leads to an appreciating currency that makes imports cheaper. However, an appreciating nominal exchange rate also reduces the competitiveness of other tradeable sectors, for example, manufacturing, agriculture, and tourism. Increased income also generates spending effects within the domestic economy which primarily benefits (and leads to increased prices) in the non-tradeable services sector. These effects are commonly known as “Dutch Disease”, which is characterised by structural decline in tradeable sectors outside of resource extraction. This can generate domestic vulnerabilities if commodity prices experience sudden declines.

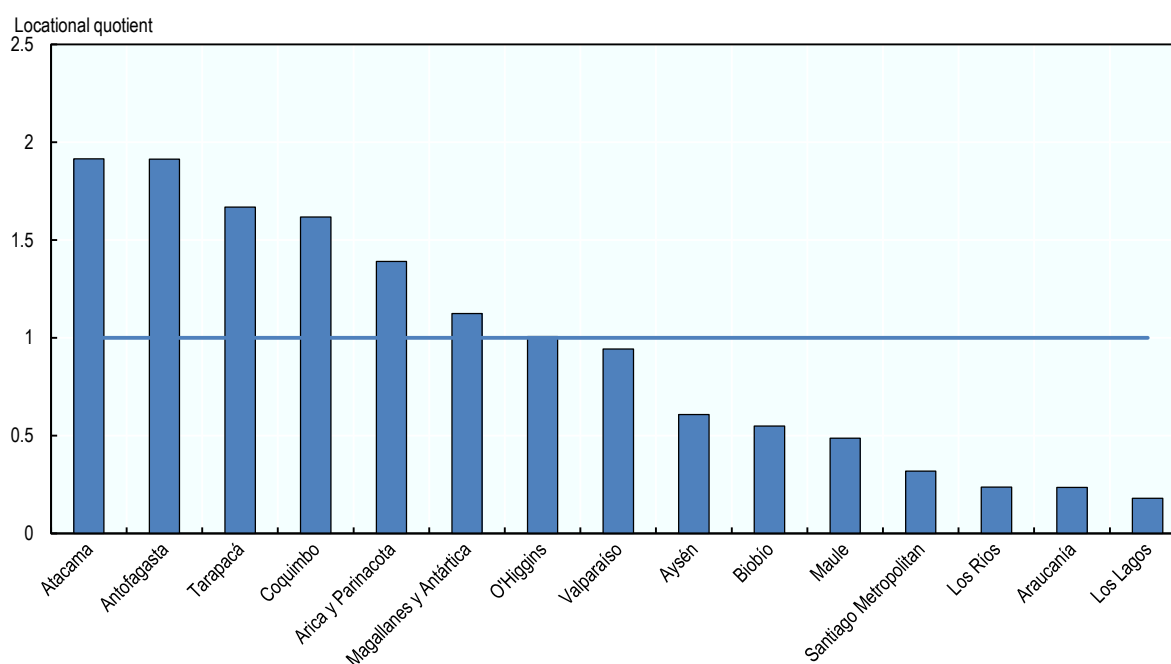
Fiscal and monetary policy can be used to address the challenges of resource-based economies. Changes in commodity prices impacts government revenues, for example, a period of increased commodity prices tends to increase public revenues (and vice versa). If public spending also increases in during a period of high commodity prices and strong overall growth it generates the risk of overheating the economy. Stabilisation funds have been used in a number of countries to help smooth public expenditures across the commodity cycle and provide counter-cyclical stimulus when commodity prices decline. Direct taxation of the resource sector can also be increased in order to lower overall tax levels for business across other parts of the economy, which can help maintain competitiveness in the face of rising factor costs.

Governments have also sought to address these issues through proactive approaches to economic diversification. This includes incentives and ongoing subsidies for multi-national firms in other sectors, and/or sector specific investment in projects such as infrastructure and industry parks. However, there is a long list of examples of where this has not worked due to the problems associated with governments “picking winners” and generating dependency on public subsidies. Diversification efforts can be assisted by improving basic framework conditions for entrepreneurship and SMEs including reducing regulatory burdens, improving education and training, and access to finance. Programmes that address information asymmetries (e.g. technology transfer and about potential export markets), and the transfer of business knowledge and skills (e.g. marketing, financial management) can also support diversification efforts.

Natural resource based economies also face political-economy challenges in implementing macroeconomic reforms to address risks associated with “Dutch disease” and the inflationary impacts of commodity booms. Some of the long-term reforms that can help mitigate these risks (taxing resource rents and establishing stabilisation funds) can be difficult to implement particularly when these sectors play prominent roles in the domestic economy. Public spending from the proceeds of resource rents also needs to be carefully designed with appropriate controls in place to reduce the risk of corruption and misallocation of public resources. A higher natural resource share in the economy is also often accompanied by higher income inequalities, which can increase demands to compensate those sectors, population groups or places not benefiting from growth in mining and extractive sectors.

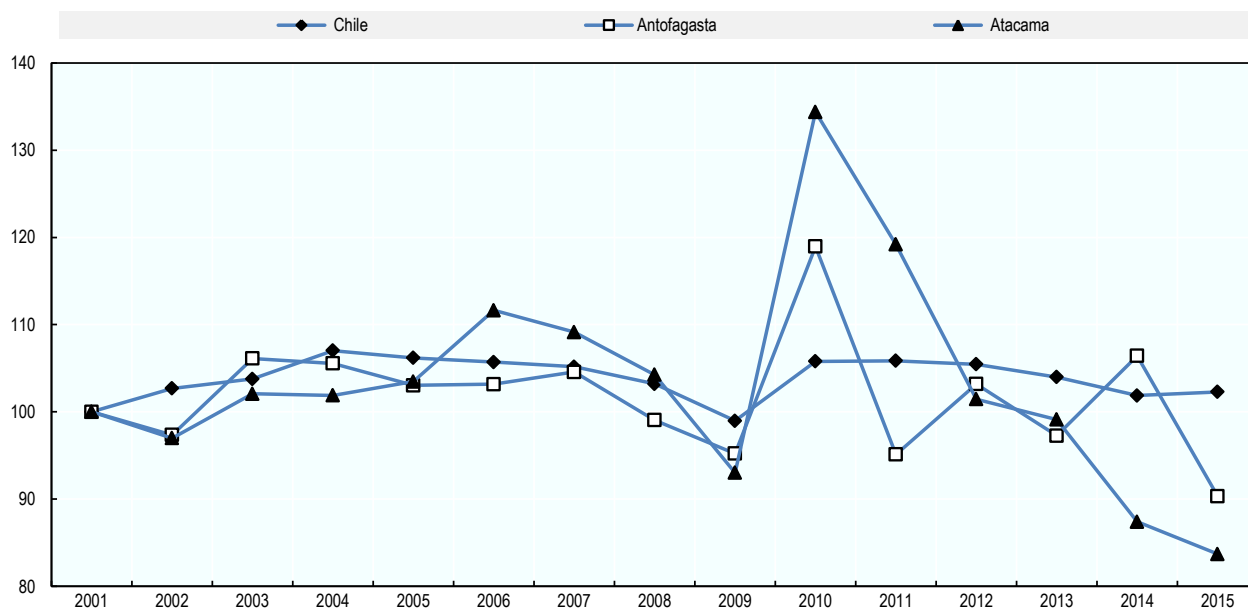
Effects at a regional level

There is a strong sub-national dimension to mining and extractive activities which amplifies these effects. The first and most basic observation is that mining and extractive activities are spatially concentrated across national territories because metals, minerals, oil and gas are extracted in particular locations. This can be demonstrated in the case of Chile, which shows the relative specialisation in employment in mining and extractive activities for Atacama and Antofagasta relative to other regions in the country (Figure 2). This uneven distribution of economic activity related to mining and extractive activities is a pattern observed in other OECD countries such as Australia, Canada, Sweden, and the United States.

Figure 1. Specialisation in mining and extractive activities (employment), Chile, 2015

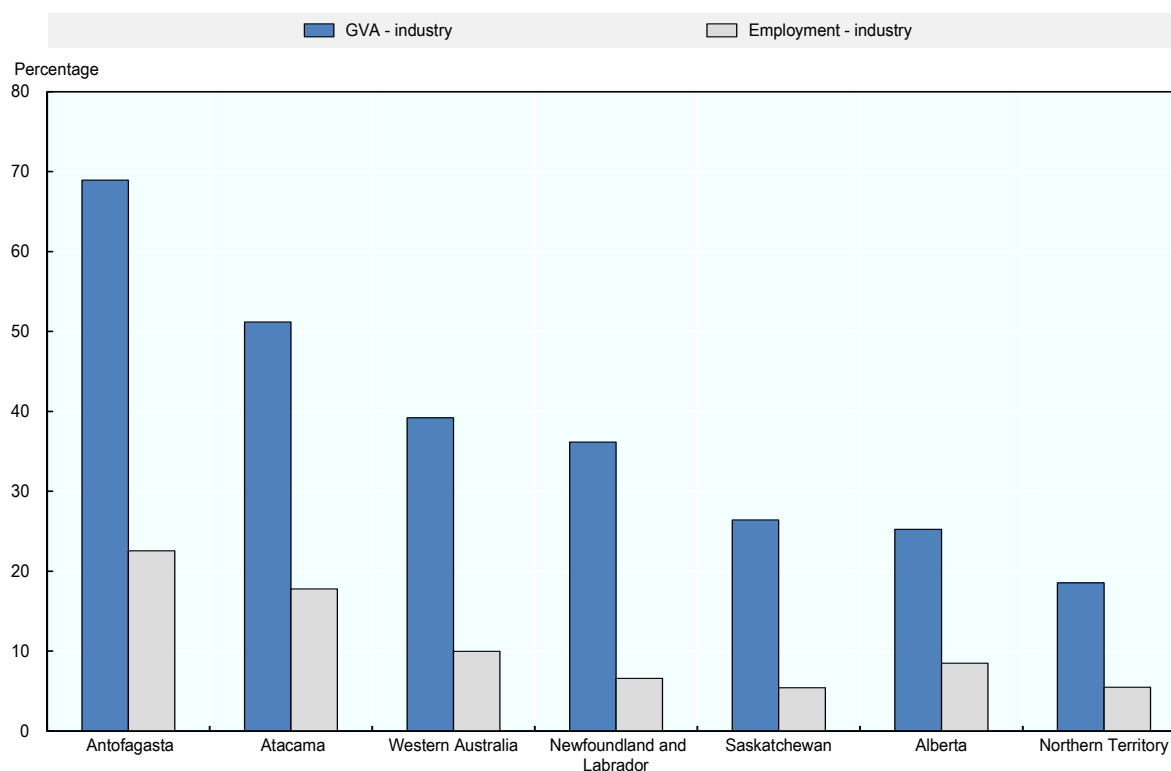
Source: OECD Regional database. Note – the industry category including mining and extractive activities, and energy and water. The locational quotient is the ratio between the sector weight in the regional employment, and the weight of the same sector in the national employment. A value above 1 implies that the region is more specialised in that sector than the rest of the economy.

Mining and extractive activities are a key part of the tradeable sector and a change in this sector has an important multiplier effect within regional economies. This dynamic occurs as the income from mining and extractive industries flows into the region and generates additional activity for local suppliers who spend a part of this on additional local consumption. This growth dynamic is particularly important for regions that are not close to major metropolitan centre. Metropolitan economies (those with a population over 500,000) usually have thicker markets with growth driven by higher value producer services and manufacturing, and also benefit from the scale of their internal market. In contrast rural economies have smaller, less diverse market structures and economic performance is more strongly influenced by external factors linked to agriculture and natural resource exploitation. The most obvious impact of this for natural resource based regions is the volatility in growth compared to the national level (Figure 3).

Figure 2. GDP growth comparing Chile, Antofagasta and Atacama (2001-2015) (2001 = 100)

Source: OECD Regional Database

Mining and extractive sectors also have particular impacts on the labour market. The productivity of this sector tends to be higher than tradable activities and is typically very capital intensive, meaning they employ a very low share of the workforce. For example, Figure 4 shows the relative share of regional gross value added (GVA) relative to employment in a select number of regions in Australia, Canada, and Chile which are specialised in the mining and extractive sector. This high productivity (which supports higher wages) is only captured by a very low share of the workforce and the population in general. This workforce is also increasingly mobile and characterised by “fly-in/ fly-out” or “drive-in/drive out” dynamics. Higher wages supported by extractive industries and the capture of benefits by a low share of the population can contribute to higher inequality within regions. These issues will be discussed in further detail later in the paper.

Figure 3. Percentage of GVA and employment, industry, select regions (2013)

Source: OECD Regional database. Note: industry figures (ISIC rev 4) exclude manufacturing and include mining and quarrying, energy, and water supply.

Regions and their cities with a mining specialisation must cope with the uncertainty of movements in external demand and price fluctuations, which are beyond their control. Three main and sometimes overlapping phases, which are externally driven, can be identified which influence growth outcomes for regions specialised in mining and extractive industries: (i) the investment phase can lead to relatively large increases in local economic activity and employment due to the capital investment required to establish new mining and extractive activities; (ii) when mining operations are established (the production phase) they create ongoing business and employment opportunities in the region often at a higher income and wage level than other sectors; and, (iii) the closure of mining and extractive operations can then lead to significant reductions in local economic activity and employment. Fluctuations in commodity prices across the investment and production phases can also result in positive and negative flow-on impacts within a region.

Mining regions and their cities are faced by a complex set of opportunities and challenges in managing these dynamics which are largely driven by changes in external markets. In the investment phase this can be related to the impacts upon traded sectors within the regional economy (local Dutch disease effects in sectors such as tourism and agriculture), and in relation to the cost of housing and provision of public infrastructure. During the operational phase questions about how to strengthen local supply chains and improve the quality of life offer to capture more benefits within the region can emerge. Issues related to public investment of the proceeds of resource rents can also be at the forefront. The closure and downscaling of mining and extractive industries can also leave a complex set of policy challenges including how to manage redundant land and infrastructure, and support the transition of local workers. Based on an initial review of these issues, the OECD has identified three key policy areas which are of particular interest to mining regions and their cities in managing these challenges:

- Policies to enable the development of the mining industry, that support productivity and also strengthen the supply chain linkages and diversification efforts around mining activities, and lead cities and regions towards a diversified economy.
- Good practices related to quality of life and addressing well-being challenges that affect cities and regions with a high degree of dependency on mining and extractive industries.
- Subnational governance and good practice models that address the complex relationships between national governments, the mining industry and local stakeholders in relation to issues of economic development and well-being.

Each of these key policy issues will now be discussed in turn.

2. Competitiveness and productive diversification for regions with extractive activities

2.1 What is this issue about?

Specialisation in mining and extractive activities generates peculiar growth dynamics for regions and their cities, and different policy challenges related to economic development. Extractive activities tend to crowd out other tradeable sectors due to competition for both human and physical resources, which can leave the region vulnerable when these non-renewable resources are exhausted or market conditions change. It is in the interest of firms engaged in extraction seek to drive down costs whilst national governments capture revenues which can leave the local economy not getting much from mining activities. The objective of this section is to identify the key issues for policy makers related to increasing productivity and the capacity to capture more value and diversify regional economies. It begins by outlining the key challenges and opportunities related to productivity and diversification, which is followed by a discussion about their policy implications. The section concludes by identifying some key questions to inform discussion at the event and future work by the OECD on this topic.

2.2 What are the key opportunities and challenges for mining regions?

Extractive activities are tradeable in nature meaning resources are extracted from the region and then exported to other regions in the same country or to other countries. Extractives are part of tradable activities with even more peculiar characteristics. Resource rents generate a higher rate of profit than other sectors and these activities are also typically very capital intensive. However, without the right policy settings in place regions may not benefit from this resource endowment. Capturing greater benefit within regions with a specialisation in mining and extractive activities requires addressing two key productivity challenges. The first is how to increase the productivity of the mining sector in the region, and the scope for local value-adding related to it. Commodities are traded in global markets and are coordinated through global value chains (GVCs) with complex backward and forward linkages that include other sectors such as manufacturing, transport, construction and other services. Regions need to understand their role and niche within these value chains. The second challenge relates to increasing productivity in other traded sectors outside the mining and extractive supply chain. Developing other competitive strengths can help reduce the vulnerability of the region to changes in external demand for key commodities, or in the cases where non-renewable resources are reduced or exhausted. Increasing regional productivity relates to a number of inter-connected policy areas including infrastructure to reduce transport and communications costs, education and training opportunities to meet demand for skills, and fostering entrepreneurship and innovation to support local business growth.

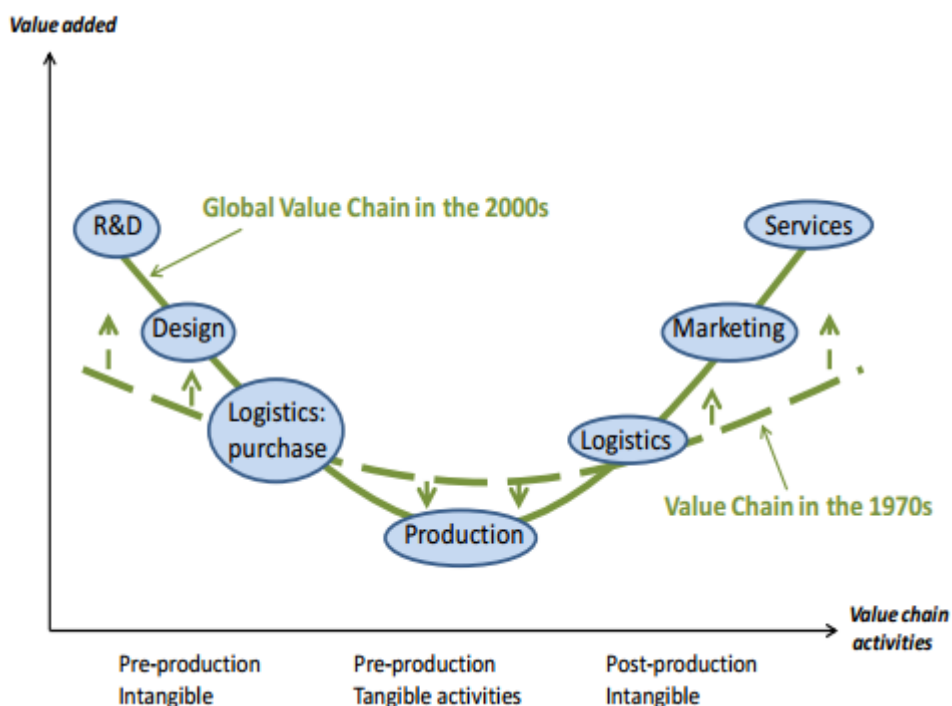
Increase productivity in extractive industry

Traditional policies to increase the productivity and the competitiveness of mining and extractive industries in regions have focused on reducing transportation costs, ensuring the supply of reliable and affordable energy, and attracting skills. Extractive industries that are specialised on exporting relatively unprocessed raw materials are very sensitive to transportation costs and reliability of logistics. In some instances the reduction of marginal gains in transportation costs can make a significant difference to their competitiveness. This suggests the importance of ports, connecting rail and road infrastructure, and inter-modal facilities in the region. The extraction and processing of minerals, metal, oil and gas is also energy intensive and the supply of reliable and competitive energy is also a key factor in increasing productivity and competitiveness. Extractive industries also rely on workers with very specific sets of skills. Although the higher salaries typically offered to workers with these skills is an important incentive to attract them to the region, equally important are efforts to improve the attractiveness of the region, its services and quality of life to retain skilled workers over the medium and long run.

Analysis of Global Value Chain (GVC) provides new insights on how to generate more value from mining and extractive activities in regions. The emergence of the GVC revolution is closely linked to the recent joint OECD – WTO Trade in Value-Added (TiVA) initiative which measures the flows of goods and services from global production chains beyond traditional measures. The initiative focuses the *value-added* of each country in the production of goods and services rather than just the export basket. This indicator captures the value that each country adds in the production process, putting more emphasis on the generation of value rather than on the exports of goods and services.

The GVC framework is very relevant to extractive activities. Through GVCs, firms draw on the international, instead of national, knowledge, resources and production factor base which allows further specialisation and realisation of greater economies of scale. In resource-intensive economies, “upgrading” in global or regional value chains may be a promising way of avoiding the “resource curse”. Although there are different ways for companies, countries and regions to upgrade into GVCs, the functional upgrading – which is achieved when firms can provide competitive products or services in new segments or activities of a GVC are associated with higher value added – is often associated with the widespread use of the so-called smiley curve to describe the process of moving up the value chain (Figure 2). Baldwin (2012) has argued that there has been a tendency in OECD countries for the “smiling” curve to deepen.

Figure 4. The “smile-curve” has deepened.



Source: Based on Shih (1996) and Gereffi (2005)

Although the smile curve has been developed for IT and electronics manufacturing it can provide some valuable insights for extractive industries, indicating a potential to generate more value in the promotion of innovative intensive extractive activities (during the pre-production process) or in services related to extractive industries. For example an area of potential is the exports of particular skills and technologies acquired from specialisation in mining (e.g. mining-related engineering services) to supply related services in foreign markets. Furthermore acquiring a strong position in downstream segments of mining-related chains might create opportunities to add further chemical or manufacturing processing and thereby increase sophistication and diversification of the exported product bundle.

Policies that can be effective at moving towards the higher value added activities include:

- Strengthening linkages between research and educational facilities with the private sector to enhance the transfer of knowledge and strengthen the link between the private with the education sector (e.g. triple helix partnerships)
- Providing information, training and technical support for local firms to deliver services to mining and extractive operations (e.g. consulting services, camp services, health and safety, and security)
- Working with local mining services firms to expand markets outside the region and into related sectors.

Box 1. Local content policies in mining exporting countries

Use of local content, procurement and capacity building measures in the mining sector is widespread. Many governments aim to extract additional benefits for local populations, beyond tax and royalty revenues. Some mining firms consider that capacity building policies are needed to create a pool of competent and competitive suppliers and a workforce with the required skill level close to their operations. Some also consider that local content policies are associated with a social license to operate within the region.

Creating an open and supportive trading environment for both extractive industries and their suppliers can help to increase productivity and foster transfer of technology and innovative business practices. Today, three quarters of international trade takes place in intermediates, i.e., inputs and investment goods or services that contribute to the production process. Protectionist measures against such imports increase costs of production and reduce a country's ability to compete, both at home and abroad, and to participate in global value chains. Similarly, restrictions on the export of mineral products reduce the profitability of mining firms.

Mandatory, quantitative local content and procurement measures seem not to be the most efficient or effective way to achieve the objective of leveraging natural resources for broader economic development. Policies that impose quantitative requirements such as a mandatory share of local employment or procurement generally have a negative impact on productivity, including in the mining sector itself, thereby producing the opposite effect to that pursued. Policies that affect the profitability of companies also reduce both their incentive to re-invest and the amount of taxes that they pay in the country where extraction takes place.

The importance of creating a business friendly environment to stimulate the development of the local private sector cannot be overstated. This includes reducing administrative red tape to business establishment and simplifying procedures, including approval procedures to obtain permits and licenses. Necessary enabling conditions also include addressing both soft and hard infrastructure and energy deficits as well as ensuring access to finance, in particular for SMEs, at competitive cost.

Education and training are the cornerstone to participation in any economic activity. In order to ensure that the labour requirements of the mining sector are met, and to address existing gaps and mismatches, some governments have undertaken specific skills development and training programmes. These require working closely with universities and technical centres, ideally in partnership with extractive firms, to develop specific types of skills. The Canadian government, for example, has invested resources in regional training centres in minerals-rich regions of northern Ontario, in conjunction with Vale, in order to maximize local employment potential.

Some policies have been quite effective in upgrading or increasing local inputs into production processes in the extractive industries. Some local and regional entities aim to reduce information and capacity gaps that diminish local firms' chances of responding to extractive firms' tender. These can include offering technical or business assistance to SMEs; keeping databases on supplier firms; tailoring the size and scope of contracts to a level that may be more easily captured locally; aiding suppliers in obtaining necessary certifications to respond to the needs of extractive firms; and ensuring timely payment facilities for SMEs with limited cash flow.

Successful suppliers development programmes, for example, have helped to create clusters of firms that provide goods and services to the mining sector. Such programmes can increase capacity and employment in local SMEs, create deep linkages, and foster innovation, transfers of technology and business process knowledge. Increased capacity near the mine site can also substantially reduce delays and costs for extractive firms. BHP-Billiton created its World-class suppliers development programme in Chile, then joined by Codelco, to address its competitiveness challenges jointly with local suppliers. Such programmes enhance the benefits of proximity for suppliers and increase their access to information about mining firms' needs. A supplier's development programme in Brazil, REDES, is managed by a business association to address information and technical constraints of suppliers to different sectors such as mining, energy and agro-food. Such programmes that offer assistance to suppliers of different sectors may also increase the potential for diversification of activities.

Source: Korinek, J. *Local content policies in minerals-exporting countries*, OECD Trade policy paper, forthcoming.

Diversify into other economic activities

As discussed earlier in the paper, a specialisation in the mining and extractive sector can stifle the competitiveness of non-extractive tradeable activities. At the same time, these types of regions are exploiting an area of comparative or even absolute advantage, which is desirable from an economic standpoint. However, this specialisation leaves the region vulnerable to changes in external demand and to price fluctuations. Rapid changes in these factors and the exhaustion of resources that can be extracted with current technologies can result in significant adjustment costs. These costs can be mitigated through mechanisms such as “fly in / fly out” work practices, and the movement of labour into other sectors of the regional economy. For some regions, however, these options can be limited particularly in rural remote areas. Diversification of economic activity into related areas and fostering the growth of other traded activities is a strategy for mining regions and their cities to manage these risks. This requires a careful assessment and support of local strengths and weaknesses that can be leveraged to support growth.

Economic diversification is, in essence, about identifying one or more new and profitable niches in the international division of labour. While cutting-edge innovations might meet this challenge, for many economies, what is needed is to discover new potential for producing established products profitably. It is difficult to know *ex ante* what new activities might be competitive, given the cost structure of the economy, if only because the existing set of market prices in an economy reveals nothing about the potential profitability of alternative (as yet hypothetical) resource allocation (Rodrik, 2004). Moreover, entrepreneurs moving into new (to the economy) sectors must often compete directly with established producers elsewhere, even before they have achieved critical mass or reached the levels of productivity they might be capable of attaining. This challenge is even more daunting in geographically remote, low-density places. Producers in such places who are oriented towards external markets must often cover higher transport and capital costs and then compete on distant markets with rivals who source inputs and services in much deeper, more competitive markets.

Diversification efforts are likely to involve a great deal of trial-and-error: outcomes cannot generally be determined and planned *ex ante*. This implies that the outcomes of successful diversification policies will be difficult to predict, so policy makers should resist the temptation to try to define the production structure towards which they believe the economy should evolve. The emphasis should be not on pre-determined “strategic sectors” but on fostering the emergence of new activities, some of which will fail and others of which will take root. Policy makers also need to be careful about the potential sunk costs associated with investing to support the emergence of new activities. For most mining and hydrocarbon regions, these investments are likely to involve, to some extent, helping industrial producers to move up the value chain, thus diversifying on the basis of existing strengths. However, the particular directions that this evolution will take are impossible to foresee, and other new activities are also likely to take off, given the right conditions.

The recently established smart specialisation agenda adopted by the European Commission can be a useful framework to ensure regions with extractive activities can maximise value in these activities – by diversifying and adding value in their area of specialisation – but also mitigate their vulnerability to external factors by specialising in other activities based on their assets to also incentives economic activities in other sectors beyond the extractive ones.

Box 2. smart specialisation

The theoretical origins of smart specialisation are deep and are grounded in the classical economic theories of economic growth (e.g. the theory of the division of labour by Adam Smith) and notably trade specialization. Smart specialisation thus is very much an economic framework focused on regions that aims to illustrate – for the purpose of policy making – how public policies, framework conditions, but especially R&D and innovation investment policies – can influence economic, scientific and technological specialisation within a regional policy framework and through this mechanism, productivity, competitiveness and economic growth. Another important feature of the smart specialisation concept is that through policy interventions focused on releasing entrepreneurial forces, it aims to impact not only on the rate but also the direction of innovation. The core elements of the smart specialization concept for policy include:

- **Self-discovery or entrepreneurial discovery process.** Prioritisation is no longer the exclusive role of the state planner (top down) but involves an interactive process in which the private sector is discovering and producing information about new activities and the government provides conditions for the search to happen, assesses potential and empowers those actors most capable of realizing the potentials. But entrepreneurship in the knowledge economy recognises that value added is also generated outside sole ownership, in spillovers, in networks of complementarity and comparative advantage. These are the two sides of the smart specialisation coin. Implicit in this is the need for better co-ordination mechanisms between regions and national governments for allocating resources in an environment of structural change and uncertainty, risk, and information asymmetries
- **Activities, not sectors per se are the level for setting priority setting for knowledge investments.** While sectors still matter, the issue is not to target sectors but rather activities. Activities can be tied to specific technologies or the technology mix, to specific capabilities, natural assets etc. In general what is discovered as future priorities are those activities where innovative projects complement existing productive assets, hence the need to differentiate the target of smart specialisation according to the overall position of a given activity (e.g. modernisation, transition, diversification, radical foundation and the key notion of related diversity).
- **Smart specialisation entails strategic and specialised diversification.** Rather than encouraging specialisation along pre-determined paths, the smart specialisation approach recognises that new or unexpected discoveries of activities might emerge within a given parts of an innovation system leading to “specialised” diversification.
- **Evaluation and monitoring.** As other versions of new industrial policies, smart specialisation emphasises the need for policy makers to carry out evidence-based monitoring and evaluation and to feed-back into policy design. It also requires flexibility in policy making to be able to terminate or reallocate public support to R&D and innovation. For that purpose, clear benchmarks and criteria for success and failure are needed. Smart specialisation policies need to have measurable goals, whether it involves an increase in business R&D, R&D commercialisation or research excellence.

Source: OECD (2013d), INNOVATION-DRIVEN GROWTH IN REGIONS: THE ROLE OF SMART SPECIALISATION.

2.3 What are the policy implications?

The policy implications for mining region and their cities are two-fold and relate to two key policy objectives:

1. Producing more value in extractive industries and the network of firms that provide goods and services to it
2. Diversifying into other economic activities

The key issues and potential action areas associated with each of these objectives is outlined in the following table.

Table 3. Summary of key policy implications related to competitiveness and productive diversification for mining regions and their cities

Policy objectives	Key issues	Potential action areas
Producing more value in extractive industries	<ul style="list-style-type: none"> • Regions specialized in an extraction and first stage processing “low value-added” trap • Constraints/ lack of reliability in electricity networks • Bottlenecks in regional transport and logistics systems • Development and retention of highly specialised skills • Lack of information and expertise in local firms to participate in mining supply chain • Limited transfer of knowledge and technologies between local firms and higher education institutions 	<ul style="list-style-type: none"> • Providing support for local firms to deliver services to mining and extractive operations • Working with local mining services firms to expand markets outside the region and into related sectors • Long-term planning and investment strategies for regional infrastructure networks • Public-private partnerships to deliver infrastructure • Improving local and regional education and training systems • Strengthening relationships between research and educational facilities and the private sector
Diversifying into other economic activities	<ul style="list-style-type: none"> • Dependency on a single or small number of employers exporting a narrow basket of commodities • Relatively high factor costs impacting on competitiveness in other sectors • Lack of diversity in local education and training services • Lack of information about new external market opportunities 	<ul style="list-style-type: none"> • Regional economic planning to identify areas of absolute and comparative advantage • Strengthening institutions (working groups, clusters) that can foster interactions between entrepreneurs and researchers • Provision of information to firms about external market trends and opportunities • Availability of small scale grants and credit to SMEs and start-ups

2.4 Questions for discussion at the event

- What strategies has your region put in place to retain greater value locally from mining and extractive activities?
- What initiatives seem to work in terms of developing other strengths outside of the extractives sector which leverage absolute and comparative advantages?
- What are the key lessons from managing structural adjustment and transition in mining regions?
- How can regions adapt to new trends in the mining sector driven by technologies such as the internet of things, and robotics?
- How can industry, government and non-government organisations work together more effectively to support innovation and diversification efforts for mining regions and their cities?

3. Quality of life and wellbeing

3.1 What is this issue about?

Specialisation in mining and extractive activities generate dynamics - greater volatility in economic performance, high wages, changes in land use, and transport movements – that generate costs and impacts upon local quality of life in mining regions and their cities. This can include policy challenges such as how to maintain the supply of affordability and high quality housing, provide urban amenities for skilled workers, include marginalised groups, and manage access to land and water resources. The objective of this section is to identify the key issues for policy makers related to improving quality of life and wellbeing for mining regions and their cities. It begins by outlining the key challenges and opportunities related to local quality of life and wellbeing, which is followed by a discussion about their policy implications. The

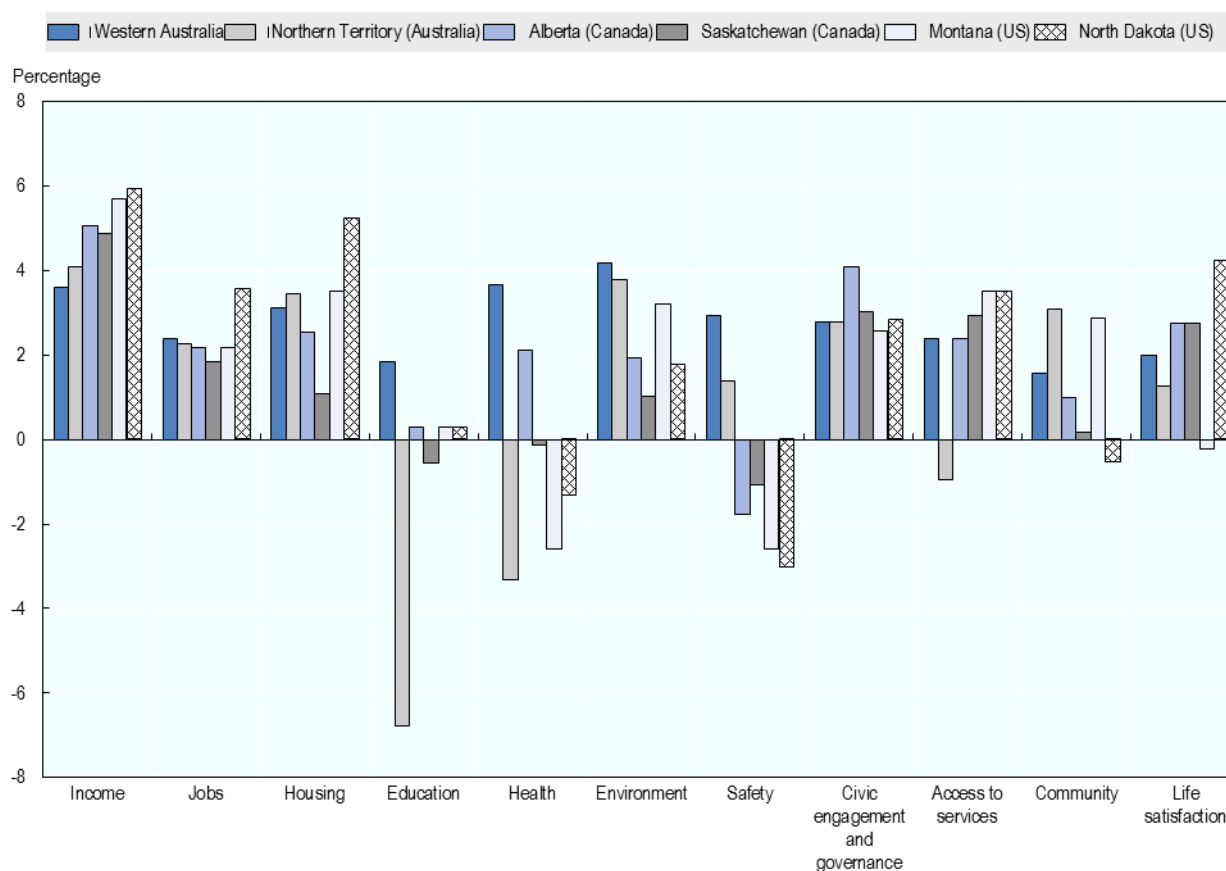
section concludes by identifying some key questions to inform discussion at the event and future work by the OECD on this topic.

3.2 What are the key opportunities and challenges for mining regions?

Quality of life and wellbeing is a broad term that captures two key elements which are relevant for the development of mining regions and their cities. The first recognises that mining regions are strong drivers of economic growth; however, there is also a need to deliver a high quality of life for citizens and protect the natural environment. This reflects an increasing focus generally across OECD countries about broadening measures of progress beyond traditionally used measures such as Gross Domestic Product (GDP) toward a broader conception that covers material and non-material factors (OECD 2015). Mining and extractive activities generate environmental impacts and externalities, which need to be carefully managed, which includes impacts on local air and water quality, and competition between different sectors for the use of water. The second is that the development and growth of the mining and extractive sector can have uneven impacts on population groups and places within regions. This can contribute to income inequality, issues with the affordability of housing, and competition with existing land users. There is recognition that increasing inequalities can undermine long-term economic performance at a national and sub-national level and a greater focus is needed on making growth more inclusive (OECD 2016). Inclusive growth policies refer to initiatives that help improve living standards whilst delivering a more even share of the benefits amongst population groups and places (OECD 2017).

Enhancing quality of life and protecting the natural environment

There is an increasing recognition of the need to go beyond GDP and other economic measures to develop a better understanding of how societies are performing. Quality of life and wellbeing has also gained attention as a regional development policy concept because it captures a number of factors that are important to the competitiveness of places. The quality of life of mining regions can be assessed through the OECD regional wellbeing framework which encompasses 11 dimensions: income, jobs, housing, health, access to services, environment, education, safety, civic engagement and governance, community, and life satisfaction. This framework is multi-dimensional, covers both material and non-material factors, and considers what people value about where they live and work. This can be explored using a select number of cases of mining regions in high income OECD countries relative to the OECD average across these different dimensions. These regions score relatively well in terms of income (per capita household income), jobs (employment and unemployment rates), and housing (number of rooms per person). These scores reflect the economic strengths of these places. However, these regions score relatively poorly in relation to key social measures: education (secondary school completion), health (life expectancy and age adjusted mortality rate), community (friends and relatives to rely on), and safety (homicide rate). These findings on the social dimensions require further analysis but may indicate some of the problems associated with growth and employment volatility, and socio-economic inequalities.

Figure 5. OECD Regional Wellbeing Framework – comparing select regions with OECD averages

Source: OECD Regional wellbeing database (<https://www.oecdregionalwellbeing.org/>). Note select regions have been identified based on their locational quotient score for employment GVA. Based on weighted average of OECD regions across different components of the OECD Wellbeing framework.

In terms of quality of life the opportunities for mining regions and their cities relates to increased employment (including highly skilled workers), and public and private sector investment related to mining and extractive sectors. Investment and growth in mining and extractive sectors generates a range of high wage/high skilled jobs in mining and related sectors (particularly construction and transport). An important policy objective for many mining regions and cities is creating an environment attractive for the retention of skilled labour (e.g. theatres, cinemas, restaurants and cafés, good quality housing options, schools and public facilities). Increases in high skilled/high wage work generate multiplier effects in local economies increasing demand for labour in other parts of the non-traded sector (for example retail, accommodation and food services, and public services). Local employment opportunities in mining and related sectors also generally results in higher levels of migration, and the need for policy efforts to support migrant integration. Although this depends on how some companies structure their workforce, for example, through the use of “fly in and fly out” workers (McKenzie et al. 2014).

Increased mining and extractive activity can also generate more public revenues and opportunities for private sector investment. This creates opportunities for local municipalities and regions to improve local infrastructure and amenities such as roads, ports and intermodal facilities, public open space, and sport and recreational facilities. For example, new mining investments require new and upgraded roads, rail and port facilities. It is important that these investments are carefully planned and sequenced in order to reduce impacts on local quality of life. However, the scope for local municipalities and regions to invest in this

infrastructure depends upon how tax and transfer systems are structure (discussed further in the governance section). In some cases, strong growth without adequate increases in local public revenues and effective strategic planning can result in overcrowding of existing public infrastructure and services, and sub-optimal investment choices.

Mining and extractive industries also generate environmental impacts and externalities, which need be carefully managed to ensure long term quality of life and wellbeing for local residents and to minimise impacts on other industry sectors. Across OECD countries mining and extractive activities are regulated closely to reduce environmental risks and impacts such as the erosion of soil, sinkholes, and the contamination of soil and water. For some mining regions past mining and extractive activities have left legacy costs which are costly to ameliorate and can contribute to long term public health issues (OECD 2013). Some mining activities (such as copper and gold) are significant of water and the use of water has to be carefully planned for in relation to other users (such as residents and agricultural producers), particularly in remote areas which may lack the necessary infrastructure. Mining and extractive activities can also impact upon quality of life in urban areas. For example, land use conflicts between port/ industrial and residential/commercial uses can emerge due to impacts on air quality and urban amenity.

Inclusive growth: generating a more even share from development

Recent OECD analysis demonstrates a number of linkages between lower productivity growth and increasing inequalities across OECD countries (OECD 2016a). Analysis of inter-regional inequalities shows a mixed picture across OECD countries (OECD 2016). Factors which are more amenable to policy intervention (access to services and broadband) have decreased over the last decade, whilst those that are less amenable (income inequality, unemployment and life expectancy) have increased. Places that are left behind and experience persistently low productivity growth can form a drag on national economic performance. Lower productivity and greater inequality result from low investment in assets, trapped resources and sluggish reallocation and growth. Regions can fall into a low-skill, low productivity, low growth equilibrium: firms do not invest there because there is no connectivity and no skilled workers; workers, therefore have limited incentives for themselves or their children to invest in improving skills and capabilities. Inequalities can also exist within regions, which is particularly stark in large metropolitan cities. Poor neighbourhoods and areas within cities also limit the capacity for the people living there to fulfil their productive potential and improve their lives.

Mining regions and their cities can experience a mixture of these trends depending which can be shaped by factors such as local institutional features, the rate of natural resource depletion, and macroeconomic factors. There is mixed evidence in relation to whether a specialisation in mining and extractive sectors is directly associated with increased income inequality (Kotey and Rolfe 2014, Fleming and Measham 2015). However, it is clear that the often relatively rapid and volatile growth trends experienced by mining cities and their regions can generate challenges in relation to social dislocation and inequalities, particularly in relation to the labour and housing markets. The labour market impacts are influenced by the degree to which “fly in fly out” workforce models are adopted. This model can be seen by local communities as a double negative because it adds to local service costs but drains potential income from the area, and these workers have low levels of attachment to the location (McKenzie et al. 2014). Local labour markets can also be more volatile related to different phases in the commodity cycle, and there is a gendered division of labour as most of the jobs are male dominated (OECD 2013). In terms of the housing market rapid growth can lead to a shortage of affordable housing, and in some cases the provision of lower quality housing to accommodate temporary workers.

Mining and extractive industries can also have a disproportionate impact on population groups within regions, particularly indigenous communities. Indigenous people are usually defined as those who maintain distinct political, languages, cultural and social practices, and inhabited a region at the time that those with

different ethnic origins arrived. The reproduction of indigenous languages and culture is often tied to particular uses of land and water resources. This has important implications for mining and extractive industries particularly in countries such as Australia, Canada, Chile, and Sweden where mining plays an important role in the national economy. Traditional settlement or reservation areas, within which indigenous communities have defined rights, mean that businesses and governments have to take a different approach to regulatory processes and investment proposals in order to balance them with existing land use practices.

Mining and extractive companies are also important players in terms of mitigating some of these social impacts through corporate social responsibility (CSR) arrangements. CSR is broadly defined as the strategies used by companies to integrate social and environmental concerns in their business operations and interactions with their stakeholders (UNIDO 2017). This can include strategies such as implementing capacity building and training projects in partnership with local communities, making apprenticeships and employment support available for disadvantaged groups, incorporating social criteria into investment and procurement policies, and initiatives to promote environmental sustainability. Many of these initiatives are implemented in the places where these companies have an operational presence and some examples of these strategies and initiatives are outlined below (Box 1).

Box 3. Examples of corporate social responsibility policies

- **Exxonmobil** has a committed to ensure human rights and preservation of cultural heritage in countries where it operates. It has launched several initiatives to encourage and speed up fluency in math and science and a program to prevent and cure malaria. Within the workplace, a focus on gender equality is identified as important.
- **Chevron** CSR strategy revolves around three pillars, namely economic development, health and education. Within the economic development axis, it committed to support SMEs (capacity building) and launched an initiative on women empowerment in Latin America and other developing countries. Concerning health, Chevron focuses on fighting HIV/AIDS and on maternal and child health. Chevron also supports programmes to foster knowledge in STEM.
- **Total's** major commitment is extending access to affordable energy in the countries where it operates. Furthermore, it aims to ensure creation of local development through local content actions (employment, enhancing the value of cultural heritage, and training).
- **Shell** CSR strategy points at providing better and affordable access to energy and create local development through local content actions. It is committed to provide better access to clean water and to tackle malaria and its spreading. In the field of education, it runs several programs for STEM.
- **BHP Billiton** aims at ensuring access to basic services in health and education in countries where it operates and through its foundation it launched the Equity in Education Program. This includes a focus on protecting human rights, recognizing the rights of indigenous people and rights, and the wellbeing and mental health of its workforce.
- **Rio Tinto** developed the Communities and Social Performance standards, a guideline based on a partnership approach to involve communities in the company's work and support their development. Rio Tinto is fully committed to prevent and address the "Modern Slavery" issue, following the directives of 2015 UK "Modern Slavery Act".

Source: own analysis.

3.2 What are the policy implications?

The policy implications for mining regions and their cities will differ based upon their unique circumstances (type of mineral extracted, geographic features, macroeconomic conditions, and the country's institutional framework). However, this initial review has identified some shared opportunities and challenges which are generated at a regional and local level due to specialisation in mining and extractive activities. In relation to quality of life and wellbeing they are: (i) enhancing local quality of life;

and, (ii) making growth more inclusive. The key issues and policy areas related to these two areas are outlined in the table below.

Table 4. Summary of key policy implications related to quality of life and wellbeing for mining regions and their cities

Policy objectives	Key issues	Potential action areas
Enhancing local quality of life	<ul style="list-style-type: none"> • Attracting and retaining skilled workers • Migrant integration • Managing the impacts of industrial development on urban amenity • Addressing environmental risks and externalities (water, soil, air and noise pollution) • Managing competition/conflicts between mining and other land/water users 	<ul style="list-style-type: none"> • Strategic land use and infrastructure planning • Traffic management measures for freight • Integrated provision of urban infrastructure and amenities • Monitoring local quality of life • Data and monitoring arrangements related to land and natural resources at a sub-national level • Public-private partnerships to facilitate infrastructure delivery • Environmental management frameworks at a sub-national level
Making growth more inclusive	<ul style="list-style-type: none"> • Social impacts of “fly in/ fly out” workforces • Diversifying local employment opportunities • Inclusion of different groups into the labour market (women, youth, and indigenous peoples) • Housing choice and affordability • Seeking consent and negotiating with indigenous communities 	<ul style="list-style-type: none"> • Social license and working with communities • Active labour market policies and local entrepreneurship support for vulnerable groups • Social impact assessments • Social housing and land use reforms to facilitate supply • Linking corporate social responsibility with local and regional development strategies

3.3 Questions for discussion at the event

- What are the main trends, opportunities and challenges related to quality of life and wellbeing in your region?
- What are your priorities for improving quality of life and wellbeing?
- What good practices have been implemented to improve quality of life, attract and retain new migrants, and make growth more inclusive?
- How can industry, government and non-government organisations work together more effectively to improve quality of life in mining regions and their cities?

4. Regional governance

4.1 What is the issue about?

Mining and extractive industries can generate significant returns but it also depletes the natural capital of a region and generates both negative and positive externalities at this scale. Resource rents also flow to benefit multi-national companies and national governments that do not necessarily have an interest or the information and competencies to address these regional impacts. The objective of this section is to identify the main fiscal and governance mechanisms that can best allow regions to manage these impacts and generate long-term benefits from mining and extractive activities. It begins by identifying key lessons related to the design of fiscal arrangements and royalty systems at a sub-national level. This is followed by a discussion of the institutional arrangements that enable regions to develop innovative, inclusive and

sustainable regional clusters; and achieve long term well-being and quality of life outcomes for the population. The section concludes by identifying some key questions to inform discussion at the event and future work by the OECD on this topic.

4.2 What are the key opportunities and challenges for mining regions?

Extractive activities tend to strongly contribute to wealth creation, which is particularly true in the investment phase and during periods of high commodity prices. This also has important fiscal implications and national governments have established mechanisms such as sovereign funds to manage these revenues in a way that supports macro-economic stability. There is also an important subnational dimension to as regions and municipalities also tend to receive, to a greater or lesser degree, depending on national legislation, royalties that contribute to increase their expenditure capacity. This capacity allows for increased investment in both economic enabling factors and in the improvement of the well-being and quality of life of the local population. However, these investments need to be well-planned, designed and sequenced to address the negative externalities generated by mining activities, avoid reinforcing localised Dutch disease effects, and help position the region for long term sustainable growth.

Responding to the challenges and opportunities faced by mining regions raises important questions of effective governance. Regional governance arrangements that enable stakeholders to develop a clear vision and priorities for development, include different local interests in decision making, and integrate policies and investments at the optimal scale are needed. The OECD has developed the *Principles on Effective Public Investment across Levels of Government* to help governments assess the strengths and weaknesses of their public investment capacity using a whole-of government approach and set the priorities for improvement to achieve more efficient public investments (Box 4). These twelve principles are grouped in three pillars:

- **Co-ordination challenges:** cross-sector, cross-jurisdictional and intergovernmental co-ordination are necessary, but difficult in practice. Moreover, the constellation of actors involved in public investment is large and their interests may need to be aligned.
- **Capacity challenges:** where the capacities to design and implement investment strategies are weak, policies may fail to achieve their objectives. Evidence suggests the public investment and growth outcomes are correlated to the quality of government, including at the subnational level.
- **Challenges in framework conditions:** good practices in budgeting, procurement and regulatory quality are integral to successful investment, but not always robust or consistent across levels of government.

Box 4. OECD principles on Effective Public Investment across Levels of Government

To help countries address these challenges, the OECD has developed the Principles on Effective Public Investment across Levels of Government. The purpose of these principles is to help governments at all levels assess the strengths and weaknesses of their public investment capacity using a whole-of-government approach, and set priorities for improvement. The principles are grouped into three pillars, which represent systemic multi-level governance challenges for public investment. The OECD instrument groups 12 principles under 3 pillars: co-ordination, capacities and framework conditions.

- Pillar 1: Co-ordinate across governments and policy areas
 1. Invest using an integrated strategy tailored to different places.
 2. Adopt effective co-ordination instruments across levels of government.
 3. Co-ordinate across subnational governments to invest at the relevant scale.
- Pillar 2: Strengthen capacities and promote policy learning across levels of government
 4. Assess upfront long-term impacts and risks.
 5. Encourage stakeholder involvement throughout the investment cycle.
 6. Mobilise private actors and financing institutions.
 7. Reinforce the expertise of public officials and institutions.
 8. Focus on results and promote learning.
- Pillar 3: Ensure sound framework conditions at all levels of government
 9. Develop a fiscal framework adapted to the objectives pursued.
 10. Require sound, transparent financial management.
 11. Promote transparency and strategic use of procurement.
 12. Strive for quality and consistency in regulatory systems across levels of government

Source : OECD (2014), Effective Public Investment across Levels of Government Toolkit

Drawing on this framework two key issues have been identified related to governance for mining regions and their cities:

- Lessons related to the design of fiscal arrangements and royalty systems that can help ensure optimal decision-making at a sub-national level; and,
- Institutional arrangements that help facilitate a place-based approach to regional development (particularly related to clusters and local quality of life).

4.3 Lessons related to the design of fiscal arrangements and royalty systems at a sub-national level

Countries with a specialisation in mining and extractive activities usually have special tax arrangements related to capturing the rents related to the extraction of non-renewable resources. Some countries use a proportion of these revenues to invest through a specific fund (e.g. Norway), and/or form part of the consolidated revenue, which is then used for various purposes such as tax reductions, welfare payments, and general service provision. In some countries there are also specific mechanisms for distributing these revenues to subnational governments. This section of the paper primarily focuses on the design of these fiscal arrangements at a subnational level. The governance mechanisms of these schemes and their interaction with the overarching architecture of the distribution of competences and resource sharing mechanisms within the country tend to have a strong impact on policy outcomes.

Sub-national arrangements for the distribution of resource rents have been established across different countries because the impacts of mining and extractive industries are amplified at this scale. One of the best examples is the localised impacts on housing markets, and the overcrowding of infrastructure and public services that occurs during a period of rapidly increasing investment and prices. Regions that do not receive compensatory royalty transfers also have reduced opportunities to retain the benefits of extractive activities be it through investments that allow improving the quality of life of the population or through fostering innovative clusters and the inclusion of local enterprises in value chains. This can reduce support in the local community for mining operations, and the resilience of these regions when market conditions deteriorate or resources are depleted.

Royalty systems at a sub-national level are ruled by different principles depending on the country. The efficiency of the transfer system has to be analysed based on its objectives and the way they interact with other governance arrangements. Although there is no optimal arrangement *per se*, some pitfalls can be avoided (Box 5). The distribution of royalties can be based either on a) compensatory objectives (compensating for externalities) or b) based on the principal that the resources extracted, at least partially, belong to the regions or municipalities where they are extracted. These different conceptions impact the magnitude transferred to subnational governments and the level of government to which they are transferred. Systems that return revenues to producing municipalities or regions may strengthen territorial inequalities horizontally (those between regions and between municipalities) and vertically (between the different levels of government). This can be exacerbated if other fiscal equalisation mechanisms are weak in the country, thus returning to the traditional question of the equity-efficiency trade-off in fiscal policy (OECD, 2011b).

Box 5. Royalty systems: Lessons from Peru and Colombia

In 2011 Colombia reformed its royalty system by shifting from an arrangement in which royalties benefited resource-rich departments to one in which the allocation of royalties is spread out more evenly across the country. This shift has important implications for territorial development policies. The General System of Royalties (Sistema General de Regalías, SGR) represents a large share of public investment in Colombia. Furthermore, Colombia has an incipient and rapidly growing decentralised government structure, and the SGR provides sub-national governments with scope and funds. The SGR created a network of collegiate bodies active at different levels of government and supported by the National Planning Department (DNP) that assesses and approves investment projects.

A review of this system by the OECD in 2014 identified some factors may work against the capacity of the new system to generate economic development. At that time a significant gap persisted between the formal and actual autonomy of municipalities and departments. Many sub-national entities, especially if they were rural, suffered from institutional deficiencies and are not able to take advantage of the SGR. This resulted in a fragmentation of investment with limited impact on long-term regional development.

The 2012 Territorial Review of Colombia identified a number of recommendations to reform the institutional arrangements for the SGR. They included:

- Strengthening institutional capacity at a regional scale to help facilitate larger scale projects. This establishing departmental development observatories that can serve as advisory technical bodies for planning, implementation and monitoring at a regional scale.
- Shifting from a short-term project-based system to evolve to a medium-term programming approach linked to a regional development strategy.
- Developing greater fiscal autonomy and accountability for expenditure at the sub-national level including greater capacity to raise local taxes.

In Peru, the most significant mining and gas revenues flow from the corporate income tax paid by mining and gas firms. These are collected at the central government level, and a share of the funds is distributed to the sub-national governments where these firms operate, generating substantial resources for producing localities and regions. The distributional system of the fiscal income from extractive industries (or the canon in Spanish) is designed to primarily compensate producing regions for the depletion of natural capital. The absence of stabilisation and equalisation funds has generated significant vertical and horizontal fiscal imbalances and inequalities between regions.

The lack of effective integration between planning and resource allocation, and programme-based budgeting instruments coupled with a misalignment of incentives (political and administrative) has led to the production of suboptimal and fragmented investments. This is exacerbated by the prominent role of municipalities in allocating funds from mining royalties (the canon).

Key recommendations of the 2016 National Territorial Review of Peru included:

- Developing a coherent strategy to build the skills and capabilities of subnational governments, which is linked to an accreditation system for increasing responsibilities (including applying the national Law on Civil Service Reform to the local and regional levels)
- Creating a task force with a mix of technical skills and capabilities (strategic planning, public finance, procurement, project management and evaluation), which can be applied in a flexible way to address critical gaps in skills and capabilities at a subnational level.
- Develop a coherent package of actions to enable better public investment outcomes at a subnational level by: i) strengthening support for subnational governments to apply results-based budgeting, which is integrated with local and regional concerted development plans; and ii) incorporating multi-year (three- to five-year) capital investment and service delivery plans into the fiscal framework at a regional level
- Designing and implementing an integrated reform to subnational finances which includes the following features: i) increasing the proportion of investment funds (such as the canon) which are allocated to the departmental level, and reducing the proportion allocated to the provincial and district levels in order to increase the overall effectiveness of public investment at a subnational level by generating increased economies of scale and the scope for policy complementarities; ii) creating a stability fund at a national level to help balance the cyclical nature of the royalties system (the canon); iii) strengthening equalisation mechanisms to help compensate for inequalities between subnational governments that are exacerbated by the canon; and iv) improving tax administration at a subnational level provide subnational governments with the capacity to mobilise their own revenues

Source : OECD (2014), Territorial Review of Colombia; and OECD (2016) Territorial Review of Peru

Stabilisation mechanisms are usually created to smooth the relative volatility of revenues due to changing market conditions. These mechanisms are desirable to avoid strengthening the risk of local Dutch disease effects. Revenue volatilities also reduce the ability of governments to plan investments over the

medium to long term. The timeframe under which funds have to be executed also impacts on the size and quality of public investment. Pressures to quickly invest the funds may lead to fragmented and lower quality investment decisions (OECD, 2016b).

Subnational governments have different degrees of independence in the use of these funds. Most of the time royalties tend to be earmarked for investments, following the logic that they have to leave a legacy once the extractive activity is over. The use of the funds is mostly destined to (and/or): reducing poverty and infrastructure gaps, productive investments and investments in innovation. To maximise the value for money, depending on the objective of the system, funds and their magnitude should be channelled to the level of government (regional or local) taking into account factors such as: the amount and objective of the transfer, and the areas of competence of the level of government to which they are transferred. National governments should take special care in improving capacities at the subnational level to improve outcomes of investments. The transfer systems should also seek to provide incentives to avoid fragmentation of public investments in order to generate economies of scale, and provide incentives to enhance vertical and horizontal coordination between levels of government (several forms of incentives could put in place such as increased chances of unlocking funds for coordinated projects between regions and several municipalities or between several municipalities).

Sub-national governments tend to have limited impact on the overall regulation of royalty systems; however, they can seek to improve capacities and planning and budgeting instruments at the subnational level. Improving the administrative capacity to prioritise, design and implement projects can significantly improve the quality of investment at a relatively low cost. This includes the technical capacities to manage the public investment cycle (such as project management, financial management, and public procurement). Instruments to effectively plan and prioritise investment are also essential to scale up investments that fit into a vision for the future of the region. This vision should be developed into concrete priorities which are integrated with public budgets. These measures should be accompanied by monitoring mechanisms that ensure transparency with local communities about the rationale and impact of different investment decisions.

4.4 Institutional arrangements to implement a place-based approach

Place-based policies based on integrating investments in enabling factors for growth are instrumental to unlocking growth potential of regions. Implementing these policies requires innovative approaches to governance. The case for a place-based approach lies in the fact that regions have different drivers of growth depending on their development level (OECD, 2012a), their institutional arrangements, resource endowment, and population size and density (OECD, 2011b and 2016b). Regional approaches can enable the right policy mix to unlock endogenous growth potential by identifying and developing new economic activities that build upon and combine existing strengths.

Collaborative institutions are key to supporting innovation and cluster development

Innovation, the generation and application of new ideas to increase efficiency and develop new products, is a key to maintaining and building regional competitive advantage. Over the past two decades ‘open innovation models’ (Chesbrough, 2003) have shown to be instrumental in the production of sustainable growth. Trust between and within the different actors (governments, business and universities) is a necessary starting point for their establishment. Such models also tend to be based on the interaction of actors connected through supplier relations, common labour markets, rivalry, knowledge spillovers and learning effects (OECD, 2012a), and more specially their institutional arrangements, resource endowment, and population size and density (OECD, 2011b and 2016b)

National and sub-national governments both play an instrumental role delivering regional policies and investing in enabling factors (Ketels and Memedovic, 2008). To operationalise this place-based approach it is important information about development bottlenecks (e.g. lack of appropriate skills, land use and infrastructure constraints, and access to credit) are transmitted efficiently to policy makers to enable timely and integrated responses. In turn, this depends upon strong relationships between different levels of government and private sector actors, and this is a key factor influencing regional innovation performance (OECD 2011b).

Open innovation models are also increasingly linked into research networks and value chains at a global scale. Global innovation networks are becoming more integrated and open and at the same time are concentrating geographically though local networks (Ernst, 2008). Institutions are particularly important in open innovation models. Brainport in the Netherlands is a good example of the importance of governance in open innovation and the impact that the government can have in developing a thriving innovative cluster (Box 6).

Box 6. Triple helix partnerships

The case of Brainport Development in Eindhoven (Netherlands)

Brainport Development can be characterised as a “horizontal triple helix collaboration” partnership, for it is based on the co-operation of large companies and SMEs, knowledge institutes and governments across various levels. Of the triple helix parties, the regional authority (the provincial government) is perhaps the least dominant, the least powerful, and the most limited in terms of resources. The project management approach builds on the model of the former Horizon Programme supported by the European Commission, which consisted of a large number of bottom-up initiatives with external project owners. Brainport Development invites the involved firms or knowledge institutes to take ownership of initiatives and projects that are being carried out. Brainport Development won the Eurocities Award in 2010 in the “co-operation” category, for co-operation among companies, knowledge institutions and government in the region of Eindhoven.

The innovation system of the region is privately driven and, as such, the role of public government and public R&D investments is limited. The development of the strategy was led by the former vice president of the multinational company DSM and the steering group included a former manager of Philips. In line with the approach of the agency to appoint external people as “project-owners”, many initiatives and projects are led, or “driven” by businessmen on a personal basis.

Kemi Digipolis: Kemi, Lapland (Finland)

Lapland is a sparsely populated region in northern Finland with a specialisation in mining. Lapland is a good case of how to build partnerships to promote innovation in this regional context. Kemi Digipolis originated as a science park in 1986 to connect ICT capability at the local university, Kemi-Tornio University of Applied science to the significant number of industrial firms in the vicinity. Today the Park hosts SMEs in the areas of: industrial services, electronics, information technology, environmental technology, corporate and training services and low-temperature and winter technology. But Digipolis has expanded well beyond the traditional role of a university science park. It is now exploring opportunities to connect large local firms engaged in mining, forestry and steel production and their local supply chains in possibly shared environmental concerns with energy efficiency, recycling and generating new by-products. In addition, it is engaged in cluster promotion and development in the Lapland Region, in helping local firms penetrate export markets in Scandinavia and in working with municipalities in to support business expansion. It also has a conference hosting capacity and provides office management services to firms in the science park.

The Digipolis example identifies the importance of developing links between academic expertise and local firms, but it also shows that in small remote places it is not possible to have as specialized an entity as a conventional science park. Because of the lack of complementary institutions Digipolis had to broaden the types for things it does to provide a more complete array of support services. Arguably, this may create a more integrated package than might be the case in large metropolitan area where different entities perform more specialized functions. However it may also be the case that there are too few resources available to be very good at all the things Digipolis is currently engaged in. But, in reality there is no choice in rural regions but to adopt the Digipolis approach.

Source : OECD (2012c), OECD Territorial Reviews: Skåne, Sweden 2012; OECD (2017a) OECD Territorial Reviews: Northern Sparsely Populated Areas.

Policy complementarities and community participation are critical to enhancing well-being and quality of life

The concept of policy complementarities recognises that different sectoral policies (education, infrastructure, economic development, health etc.) can have mutually reinforcing effects that can provide the preconditions for long-term regional growth. Designed and delivered in isolation these policies can also have unintended negative effects (Box 7). For example in rural areas improving infrastructure without investing in other enabling factors (skills, innovative capacity) can lead to “leaking by linking” effects. A focus on wellbeing allows policy makers to account for these interdependencies. The capacity to deliver these outcomes is also influenced by factors such as the rules governing the royalty system, quality of government at the sub-national level, and the system of multi-level governance (Yanguas-Arellano et al. 2014, OECD 2016b).

Box 7. Policy Complementarities: What is it and how does it work

The concept of policy complementarity refers to the mutually reinforcing impact of different actions on a given policy outcome. Policies can be complementary because they support the achievement of a given target from different angles. For example, production development policy, innovation policy and trade policy all support the competitiveness of national industry. Alternatively, a policy in one domain can reinforce the impact of another policy.

Sequencing is also important in policy complementarity. Some policies are best put in place simultaneously. For example, innovation, industrial and trade policies must be synchronised to address the issue of industrial competitiveness from all angles. Other policies realise their synergies in a sequential way. For example investments in broadband infrastructure need to be followed up with specific policies on access and diffusing those services to the population.

Complementarities between policies can be “latent”, but can be triggered by specific governance arrangements, for example mechanisms that facilitate co-ordination across levels of government (vertical co-ordination) can help attain complementarity across policies from various levels. Alternatively, they can be induced, by combining different policies through conditionality schemes, or when the complementarities are the result of strategic planning. Employment generation opportunities, for example, can be attached to direct cash transfers to support the inclusion of poor people in production so that they can avoid dependency on income transfers.

Policy complementarities can also be spontaneous when they appear as positive side-effects of independent actions of ministries or bodies.

Source : OECD (2014), OECD Territorial Reviews: Netherlands 2014, OECD Publishing.

Community understanding and ownership of the impacts related to mining operations and initiatives to maximise the regional benefits of them are also essential to improving wellbeing and quality of life. This can also create a more stable investment and operational environment for the private sector. Community participation at the earliest stage of the extractive process can generate the necessary acceptance of the population for the development of the activity and reduces the risk social conflicts (Arellano-Yaguas et al. 2011). Governments traditionally build this in at the approvals stage through mechanisms such as social impact assessments. However, ongoing forums for stakeholder engagement are required, including the necessary mechanisms to build trust by reducing negative externalities (particularly related to land and water resources, and local amenity), identifying and resolving difficult trade-offs, and implementing mitigating strategies. A key way for regions to achieve this outcome is by creating inclusive platforms for integrated regional planning. This should include a common vision for the development of the region, short to medium term priorities for delivering on it, and mechanisms to monitor implementation and enable community feedback and input.

4.5 What are the policy implications?

Mining regions face particular environmental, social and economic challenges that require the development of place-based approach to regional development. This approach enables governments, communities and industry to better manage the complex impacts, and realise the benefits of a specialisation in mining and extractive industries. Coordination arrangements between levels of government, administrative capacities at the regional level, and fiscal arrangements are particularly important for delivering this outcome. The following policy objectives have been identified as important for mining regions and their cities:

- Making the most out of fiscal transfers
- Developing collaborative institutions to facilitate cluster development
- Integrated planning and community engagement to improve local quality of life

Table 5. Summary of key policy implications related to governance mechanisms for mining regions

Policy objectives	Key issues	Potential action areas
Making the most out of fiscal transfers	<ul style="list-style-type: none"> • Lack of quality of public investment • High levels of fragmentation of investments • Lack of capacity to prioritise and sequence investment • Coordination failures and lack of capacity to leverage policy complementarities • Increasing imbalances and inequalities between regions 	<ul style="list-style-type: none"> • Adopt asymmetric decentralization • Transfer the royalty funds to the right level of government • Compensate for fiscal imbalances created by the royalty system • Invest in capacity building at the subnational level • Better link planning and budgeting and allow for multi-year planning and spending of the royalty transfers
Developing collaborative institutions to facilitate cluster development	<ul style="list-style-type: none"> • Limited levels of innovation • Lack of diversification in the economy • Lack of networks and integration in the value chains of firms • Lack of trust between actors • Limited information to policy makers about development bottlenecks 	<ul style="list-style-type: none"> • Develop a common vision and priorities for regional innovation • Build governance mechanisms to identify with the civil society the potential competitive advantages of the region • Build trust with and between stakeholders of the region • Create mechanisms to promote technological transfer
Integrated planning and community engagement to improve local quality of life	<ul style="list-style-type: none"> • Increasing house prices and overcrowding of public infrastructure • Lack of local community support for mining operations • Ineffective mechanisms to address conflicts related to the use of land and water resources • Competing visions and priorities for regional development that are unresolved 	<ul style="list-style-type: none"> • Ensure robust and inclusive regional planning processes • Develop land use planning and housing strategies that are inclusive • Engage and empower communities to solve local problems • Invest in assets that will strongly contribute to inclusive growth such assets related to education and health • Develop rural-urban linkages

4.6 Questions for discussion at the event

- What governance mechanisms have been developed in your region to promote productive diversification, and improve well-being and quality of life?

- What are the key features of the framework governing the distribution and use of royalty revenues? What type of incentives have they created? What options should be explored to reform them?
- What kind of public-private collaboration exists in your region to deal with economic development, social and environment issues?
- What mechanisms have been put in place to improve coordination between levels of government, and the capacity of subnational governments to implement regional development policies?
- What are the mechanisms used to engage communities and stakeholders around the implementation of public policies? And around the development of extractive activities?

5. Conclusion and next steps

This paper has provided an overview of the the main regional development policy challenges facing regions with a specialisation in mining and extractive industries. The impacts of this specialisation is amplified at the regional level, and successfully navigating the unique challenges facing mining regions and their cities requires the implementation of regional development policies that: (i) enable productivity growth and diversification leading to higher value economic activities; and, (ii) improve local quality of life and proactively address inequality and social license issues. Achieving these policy objectives is dependent upon developing mechanisms to enhance cooperation across levels of government and support high quality public investment decision making. The OECD has developed a preliminary framework to enable further international cooperation on these topics, and to work with regions to diagnose their economic growth performance, and to assess and develop better policies to improve prosperity and wellbeing. The framework follows the logic of this paper and includes four elements:

1. Macroeconomic and regional growth diagnosis
2. Policies to promote competitiveness and productive diversification
3. Policies to improve quality of life
4. Sub-national governance and fiscal arrangements

A brief outline of this framework is in Appendix 1. This framework would provide the basis for future research and analysis, peer review, and knowledge-sharing facilitated by the OECD on this topic.

Appendix 1: initial framework to guide OECD work on mining regions and their cities

Dimension	Policy objectives	Key issues to assess	Potential action areas
Macroeconomic and regional growth diagnosis	<ul style="list-style-type: none"> • Macroeconomic stability • Generating regional spillovers • Maximising regional productivity and catching up potential 	<ul style="list-style-type: none"> • National and regional productivity performance • Global value chain analysis • Performance of the extractives sector and regional effects • Impacts for cities and rural areas • Enabling factors for regional growth (human capital, innovation, infrastructure) 	<ul style="list-style-type: none"> • Improving data and analysis at a sub-national level (e.g. related to the extractives sector, regional wellbeing, inequalities, and local labour markets)
Competitiveness and productive diversification	Producing more value in extractive industries	<ul style="list-style-type: none"> • Regions specialized in an extraction and first stage processing “low value-added” trap • Constraints/ lack of reliability in electricity networks • Bottlenecks in regional transport and logistics systems • Development and retention of highly specialised skills • Lack of information and expertise in local firms to participate in mining supply chain • Limited transfer of knowledge and technologies between local firms and higher education institutions 	<ul style="list-style-type: none"> • Providing support for local firms to deliver services to mining and extractive operations • Working with local mining services firms to expand markets outside the region and into related sectors • Long-term planning and investment strategies for regional infrastructure networks • Public-private partnerships to deliver infrastructure • Improving local and regional education and training systems • Strengthening relationships between research and educational facilities and the private sector
	Diversifying into other economic activities	<ul style="list-style-type: none"> • Dependency on a single or small number of employers exporting a narrow basket of commodities • Relatively high factor costs impacting on competitiveness in other sectors • Lack of diversity in local education and training services • Lack of information about new external market opportunities 	<ul style="list-style-type: none"> • Regional economic planning to identify areas of absolute and comparative advantage • Strengthening institutions (working groups, clusters) that can foster interactions between entrepreneurs and researchers • Provision of information to firms about external market trends and opportunities • Availability of small scale grants and credit to SMEs and start-ups
Quality of life and wellbeing	Enhancing local quality of life	<ul style="list-style-type: none"> • Attracting and retaining skilled workers • Migrant integration • Managing the impacts of industrial development on urban amenity • Addressing environmental risks and externalities (water, soil, air and noise pollution) • Managing competition/conflicts between mining and other land/water users 	<ul style="list-style-type: none"> • Strategic land use and infrastructure planning • Traffic management measures for freight • Integrated provision of urban infrastructure and amenities • Monitoring local quality of life • Data and monitoring arrangements related to land and natural resources at a sub-national level • Public-private partnerships to facilitate infrastructure delivery • Environmental management frameworks at a sub-national level

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Dimension	Policy objectives	Key issues to assess	Potential action areas
	Making growth more inclusive	<ul style="list-style-type: none"> • Social impacts of “fly in/ fly out” workforces • Diversifying local employment opportunities • Inclusion of different groups into the labour market (women, youth, and indigenous peoples) • Housing choice and affordability • Seeking consent and negotiating with indigenous communities 	<ul style="list-style-type: none"> • Social license and working with communities • Active labour market policies and local entrepreneurship support for vulnerable groups • Social impact assessments • Social housing and land use reforms to facilitate supply • Linking corporate social responsibility with local and regional development strategies
Regional governance	Making the most out of fiscal transfers	<ul style="list-style-type: none"> • Lack of quality of public investment • High levels of fragmentation of investments • Lack of capacity to prioritise and sequence investment • Coordination failures and lack of capacity to leverage policy complementarities • Increasing imbalances and inequalities between regions 	<ul style="list-style-type: none"> • Adopt asymmetric decentralization • Transfer the royalty funds to the right level of government • Compensate for fiscal imbalances created by the royalty system • Invest in capacity building at the subnational level • Better link planning and budgeting and allow for multi-year planning and spending of the royalty transfers
	Developing collaborative institutions to facilitate cluster development	<ul style="list-style-type: none"> • Limited levels of innovation • Lack of diversification in the economy • Lack of networks and integration in the value chains of firms • Lack of trust between actors • Limited information to policy makers about development bottlenecks 	<ul style="list-style-type: none"> • Develop a common vision and priorities for regional innovation • Build governance mechanisms to identify with the civil society the potential competitive advantages of the region • Build trust with and between stakeholders of the region • Create mechanisms to promote technological transfer
	Integrated planning and community engagement to improve local quality of life	<ul style="list-style-type: none"> • Increasing house prices and overcrowding of public infrastructure • Lack of local community support for mining operations • Ineffective mechanisms to address conflicts related to the use of land and water resources • Competing visions and priorities for regional development that are unresolved 	<ul style="list-style-type: none"> • Ensure robust and inclusive regional planning processes • Develop land use planning and housing strategies that are inclusive • Engage and empower communities to solve local problems • Invest in assets that will strongly contribute to inclusive growth such assets related to education and health • Develop rural-urban linkages

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