

How to finance an industrial policy: INFF as a tool for effective implementation of structural transformation strategies

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Abstract

There is a growing consensus among policymakers and academics that structural transformation policies – that is, strategies and instruments that aim to transform the structure of an economy and enhance productivity – can provide a foundation for the long-term economic, social, and environmental objectives that underline the SDGs. However, structural transformation has shown to be a process that requires the acquisition of capabilities both in the private and the public sector, and there are gaps in the effective implementation of structural transformation policies. While most countries have some forms of industrial and financing instruments in place, they are typically not brought together in a coherent strategy, nor fully aligned with structural transformation priorities and the SDGs. This paper mainly seeks to answer why do industrial policies need a financing framework and how can countries finance their industrial strategies. To do so, the study characterizes the challenges that governments face when funding these types of initiatives, and presents a strategy that serves as a financing framework for national industrial policies. This strategy is built on Integrated National Financing Frameworks (INFF), and includes a toolkit of policy instruments for each of the action areas of the Addis Ababa agenda, with funding considerations and alternatives for governments. This way, INFF can help bridge some of the gaps between structural transformation aspirations and the investments and coordination needed to make them a reality.

December 2022

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1.0 INFF in the context of sustainable and inclusive structural transformation

The academic and policy discussion about the convenience and importance of industrial policies has shifted in the past 30 years. In the beginning of the 1990s, and following a period of economic liberalisation in which most of the Western economies understood the most effective development path to be one in which there was no industrial policy in place (CATO, 2021), a renewed view on the role of the State in promoting economic growth began to emerge, motivated by the unprecedented growth of countries like Japan, South Korea, and Malaysia (Birdsall et. al., 1993; Stiglitz and Yusuf, 200).

This renewed focus has prompted a more nuanced and pragmatic discussion about industrial or structural transformation policies. Present industrial policies are generally regarded as strategies and instruments that aim to transform the structure of an economy (its composition of industries, accumulated capital and human resources, and its set of technologies) and enhance productivity (Hausmann and Rodrik, 2002 and 2006; Hausmann and Klinger, 2006). Hence, the term structural transformation policy could be thought of as the modern equivalent of an industrial policy, and both are used interchangeably in this document.

Structural transformation policies are especially relevant for low-income and middle-income countries, but also timely for advanced nations in search for sustained growth. Even though there has been important progress in poverty reduction, the sustainable development agenda recognizes the fact that the least developed countries (LDCs) as well as middle-income nations need to accelerate economic growth in a sustainable manner and could gain momentum through productivity (UN DESA, 2022). This is also a major public policy consideration in high-income countries that require sustained growth, especially after the challenges they face following the global financial crisis, the COVID-19 pandemic, and the disruptions to supply chains around the globe (IMF, 2022).

More recently, attention has been put on industrial policy instruments that promote 'green' growth and achieve broader economic opportunities. Driven by the awareness of climate change and increasing inequality, countries are seeking ways to balance the objectives of higher productivity and growth with the need to mitigate carbon emissions and foster sufficient employment and entrepreneurial opportunities for their population (GGGI, 2020; Rodrik, 2022; World Bank, 2012, 2021a and 2021b; and Hallegate et al., 2013). Therefore, there is now growing consensus among policymakers and academics that national and subnational growth strategies, policies, and plans can provide a foundation for the long-term economic, social, and environmental objectives that underline the SDGs. OECD, 2022a and 2022b; IMF, 2022; Salazar-Xirinachs et al., 2014)

However, there are gaps in the implementation of structural transformation policies in many countries. There are open questions regarding what are the most effective instruments for industrial policies, and there is a growing need to understand the complementarities between different types of industrial policy initiatives put in place at the same time, which could either enhance structural transformation or have counterproductive effects (OECD, 2022a and 2022b). At the same time, structural transformation has shown to be a process that requires the acquisition of capabilities - both in the private and the public sector (Fernández-Arias et al., 2019). Hence, state capacity is a critical factor in attaining successful industrial, productivity and innovation

policies, and as capabilities arise, so do the financing needs for an increasingly complex set of instruments for policy action (Cirera and Maloney, 2017).

While most countries have some forms of industrial and financing policies in place, they are typically not brought together in a coherent strategy. Structural transformation objectives require a comprehensive approach that includes framework conditions, market interventions and public goods, and it is common that countries that embark in industrial policies fail to integrate a financing strategy to guarantee that resources are mobilised at the scale needed to achieve results in these fronts. These challenges highlight the need for an approach to structural transformation policy that integrates a comprehensive effort, monitoring and evaluation, governance and state capacity, and involvement of financing actors as a central part of the strategy.

Integrated National Financing Frameworks (INFF) can therefore help bridge some of the gaps between structural transformation aspirations and the investments and coordination needed to make them a reality. This integration can also help governments understand the connections to agendas for climate change mitigation and promoting equality (UN DESA, 2022). In such an approach, the public sector, private sector financing, international financial institutions, and bilateral donors can articulate around a coherent strategy as well as channel the resources required for pioneer investments that are sustainable and promote equality (World Bank, 2012).

This paper mainly seeks to answer why do industrial policies need a financing framework and how can countries finance their industrial strategies. To do so, we characterize the challenges that governments face when funding structural transformation initiatives, and present a strategy built on INFF that serves as a financing framework for national industrial policies. This includes a toolkit of policy instruments for each of the action areas of the Addis Ababa agenda, with funding considerations and alternatives for governments.

2.0 What are sustainable and inclusive structural transformation policies?

Industrial policies have been broadly understood as deliberate, government sponsored interventions to promote structural change. This is done by altering industrial structure, influencing the accumulation of capital and human resources, and fostering certain technologies that are supposed to contribute to increases in productivity, economic growth, and other positive externalities (Birdsall et. al., 1993; Stiglitz and Akbar, 2017; Rodrik, 2013 and 2017; Ocampo and Torres, 2020).

Until recently, industrial policies targeted almost exclusively manufacturing industries. These industries were considered the quintessential escalator for developing economies (Rodrik, 2015). However, premature deindustrialization and globalisation have made it necessary to broaden industrial policies to include service sectors and the interplay between services and manufacturing (Rodrik, 2015; Otaviano, 2018; Hallward-Driemeier & Nayyar, 2018). Under this new approach to industrial policies, sectors like agri-business and health care, among others, have emerged as another ground for structural transformation policies (IADB, 2022; Rodrik, 2022)

Modern approaches to industrial policy highlight the importance of promoting both the sophistication and the diversification of the economy. These two phenomena closely map to the

two main mechanisms of productivity growth: productivity via "within" sector efficiency gains (which increase the value added and sophistication of existing industries), and productivity gains via the reallocation of capital and labour "between" sectors (which results in the emergence of new, higher value-added goods and services, which diversifies the economy) (Eslava et al., 2004; Hausmann and Klinger, 2006)

However, global challenges are shaping the scope and objectives of industrial policies. Industrial policies are now being called to solve pressing issues that go beyond structural change (Rodrik, 2022). Some examples of global trends shaping industrial policy include:

- **Climate change.** Environmental sustainability and commitments to reduce CO2 emissions at a national level mean that countries need to explicitly introduce growth strategies that are consistent with attaining their Nationally Determined Contributions and other environmental-related goals.
- **Globalisation and inequality.** The shifting perceptions on the effects of globalisation on local production and the persistence of inequality within countries have changed economic development agendas.
- **The Fourth Industrial Revolution.** Digitalization and both benefits and risks of automation on employment have highlighted the need for structural transformation strategies that preserve and create good jobs.
- **Geopolitics and strategic autonomy.** The disturbance of global value chains (GVC) because of the global pandemic and the emergence of strategic autonomy as an objective in many nations - arising, in no small part due to the risks of war - have given industrial policies a role in the reconfiguration of global and regional trade.

In response to these challenges, industrial policy goals have broadened. Moving beyond structural change, productivity, and economic growth, industrial policies now include critical support for a greener economy, the creation of good jobs, and the advancement of certain technologies to attain geopolitical, technological, energy, and security advantages (World Bank, 2012; IMF, 2022; Hallegatte, Fay and Vogt-Schilb, 2013; Rodrik and Stantcheva, 2021; Terzi, Singh, and Sherwood, 2022). In the case of green growth, for example, industrial policies are considered a necessary condition to achieve reductions in pollution, a more efficient use of resources and sustainable economic growth (Hallegatte, Fay and Vogt-Schilb, 2013). In the case of good jobs, as the shift to higher-productivity industries can have the effect of disrupting slow-to-adjust labour markets, structural transformation policies can explicitly develop instruments and interventions that target "good-job" externalities (Rodrik, 2022). The emphasis of these types of inclusive industrial policies can also be broadened to support small and medium-sized firms (ILO, 2015).

Industrial policies have also started to include a gender dimension as part of an inclusive industrial development. The idea is that industrial policy can provide access to women to secure and well-paid jobs in manufacturing industries and related service sectors, and increase women participation in the development of new technologies (UNIDO, 2019). The de-feminization of industries has costly effects on the success of industrial policies by limiting the talent pool and can limit the potential for industrial policies to achieve their goals (Seguino, 2020; UN Women, 2019).

Traditionally, industrial policies seek to address the presence of market and government failures that limit structural change. The benefits of addressing these failures must outweigh the costs and risks associated with the proposed interventions (IMF, 2022; Winston, 2006). Policy initiatives not disciplined by this rationale may easily interfere with what works and be counterproductive for structural change (Crespi, Fernandez-Arias and Stein, 2014). Examples of market failures addressed by industrial policies include sector-specific or technology-specific externalities, coordination failures, missing markets, and asymmetry of information.

Even so, more recent approaches to industrial policies have highlighted the importance of going beyond market failures. This could be done by implementing state-led strategies to shape markets by steering capital and labour into activities the market would not have undertaken (Mazzucato, 2011). For instance, the urgency required to meet national CO₂-emission targets necessitates public leadership to accelerate the development of green technologies and their adoption in industries at a pace that would otherwise not be met by private initiative alone. Some interventions that go beyond market failures include:

- **Creating and shaping markets and determining the direction of growth** through public investment in R&D and firm capabilities in non-existing markets, and demand stimulus to increase business expectations about growth opportunities (Mazzucato, Kattel and Ryan-Collins, 2019).
- **Fostering mission-oriented approaches setting a clear direction for problems that required cross-sectoral investments.** This can increase business expectations about future growth areas and foster activities that otherwise would not happen (Ibid).
- **Addressing ‘grand challenges’ facing modern societies, like climate change and sustainable development, through industrial and innovation policy.** For instance, public sponsorship on net-zero R&D can help internalise the radical risks associated with climate change, for which private firms invest sub optimally (Ibid).

In conclusion, industrial policies are starting to be considered an avenue to achieve sustainable and inclusive structural transformation. This new approach to industrial policy requires the development of conceptual frameworks and policy toolkits to better understand mechanisms for implementation and introduce sustainability and inclusion, which has been a very productive area of policy research in recent years (see, for example, IMF, 2022; OECD, 2022a and 2022b; Rodrik, 2022; ILO, 2021; World Bank, 2021a; UNCTAD, 2018, Cirera and Maloney, 2017; Crespi, Fernandez-Arias and Stein, 2014; and Salazar-Xirinachs et al., 2014). Also, it requires a funding framework that maps the different investment and action areas, and involves the financing actors around the objectives of the policy, as will be discussed in the next section.

3.0 Why do industrial policies need a financing framework?

Modern structural transformation policies are starting to go well beyond the traditional fiscal tools of public spending and tax incentives. The nature of the new industrial policies as strategies to set framework conditions, solve market failures and externalities, provide access to productive inputs and shape markets means that new instruments have arisen to better complement the more

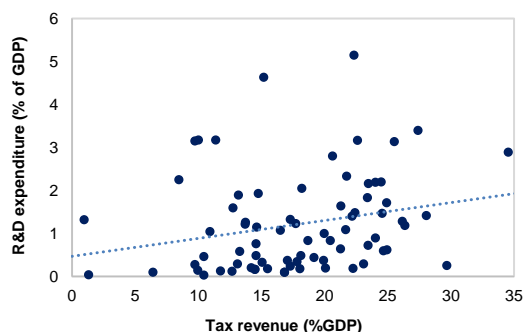
commonly used grants and tax incentives. As UNCTAD (2018) shows, even though most of industrial policy instruments are still concentrated in fiscal incentives (both through the tax code and through vehicles such as special economic zones), the policy mix is increasingly more complex.

This new breadth and scope of the industrial policy toolkit also implies that the implementation of structural transformation policies requires investments at scale. There is a need to channel financial resources at all levels (firm, industry, national and international), so a sound financing policy is a key enabler of sustainable and inclusive industrial transformations (UN DESA, 2022; World Bank, 2021).

Addressing this issue proves to be particularly difficult for developing nations, which have limited fiscal space. In fact, countries with low fiscal capacity, as measured by tax collection as a share of GDP, tend to exhibit lower private and public expenditures in R&D (Figure 1). This suggests that LDCs and other low-income countries have limited capacity to implement public expenditure and tax benefit programs to enhance productivity, and as nations gain fiscal capacity they can embark in more support via fiscal resources. In consequence, developing countries need to find tools that complement their limited fiscal instruments and help crowd-in different actors and sources of financing.

Figure 1. Countries with limited fiscal capacity need to complement public expenditure R&D instruments with other sources of financing.

(Country tax revenues and R&D expenditures as % of GDP, 2019)



Source: World Development Indicators.

A structural transformation policy therefore needs to be formulated and implemented beyond the typical scope of Finance Ministries, and requires deeper integration across ministerial portfolios. The strategy needs to promote the availability of sufficient resources for both public expenditure and private financing, and the involvement of actors in different spheres of Government and in private organisations. Also, this implies that fiscal cost is not the only constraint that needs to be assessed, and that understanding the financing barriers across action areas becomes central.

We conclude that there are four main challenges that call for a comprehensive financing framework that supports the implementation of structural transformation policies:

3.1 State capacity is key for financing and implementing strategies, and the need for resources has become greater and more complex.

Effective execution is one of the key challenges to sustainable industrialization. This occurs mainly because governments differ in their financing capacity to implement industrial policies and in their institutional capabilities (Mazzucato et al., 2019). Political priorities and public sensitivities are also different across countries, so industrial policy must ultimately support national and local development objectives and country contexts. Although some commonalities are desirable, a one-size-fits-all approach is not possible (IMF, 2022).

The implementation of correctly-devised industrial policy instruments and the pursuit of state-led missions require that governments set up adequate institutional arrangements and invest in capabilities. (Mazzucato, Kattel and Ryan-Collins, 2019).

This has implications for countries in different stages of development. For instance, in early stages governments can benefit from focusing the scope of their interventions and addressing challenges that help firms gain capabilities. Given that developing countries face challenges that are much more complex than those faced in advanced nations, and that governments in LDCs and middle-income countries often lack institutional capabilities, the dimensions in which their policies can fail are also greater. This has implications for countries in different stages of development. For instance, in early development stages governments can benefit from reducing the "failure dimensionality" of their interventions. This means that policy design should account for state capability constraints. One way to do so is to reduce the "failure dimensionality" of policies in early stages of development, with instruments ~~can be that~~ are more focused on the type of interventions that promote a variety of sectoral ventures and that help build basic firm capabilities, like promoting the acquisition of STEM skills, enhancing managerial abilities or investing in investments in the National Quality Infrastructure (Cirera and Maloney, 2017). Also, there is ample space to conduct horizontal reforms that enhance critical complementary factors for entrepreneurship and productivity growth, such as competition legislation, financial market regulation and intellectual property rules, which are required for improving the overall business environment (OECD, 2022a).

For countries in latter stages of development, capabilities will accumulate and the space for more diverse and complex instruments increases. This implies that the system can benefit from introducing instruments that promote long-term R&D programs, collaboration between public and private agencies on innovation ventures and a more sophisticated use of financial markets (Cirera and Maloney, 2017).

Therefore, state capacity has great implications on the intensity in which countries can implement strategies and achieve structural transformation, and the need for resources and financing has become greater and more complex. This does not imply that LDCs or middle-income countries cannot pursue strategies based on ambitious vertical interventions, but it does signal the need for acquiring capabilities within the State to maximise the chances of success (Ibid).

Commented [OS1]: I remember we had a brief discussion on this point, and you explaining how one can account for capability constraints in policy design. It might have been the issue mentioned in this paragraph, but was there also something else perhaps?

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3.2 **Rigorous formulation of instruments and evaluation of results are important elements for effective implementation.**

In an ever-evolving policy context, understanding elements that have enabled successful structural transformations with rigour is key for the formulation of new industrial policies. For instance, the empirical evidence has shone light on the effectiveness of certain types of instruments and identified the areas in which industrial policies face some knowledge gaps, as summarized by OECD (2022b):

- **First, supply-side horizontal instruments have been shown to have a positive impact on innovation.** These are generally exemplified by successful broad R&D tax credits and subsidies.
- **Second, supply-side targeted instruments need to be clearly aware of the market failure they correct or the market they intend to shape.** For instance, in general terms there is little evidence to support the effectiveness of targeted grants and subsidies (which are vertical and supply-side in nature), but there is scattered evidence of effectiveness for vertical instruments that target a specific market failure such as asymmetry of information, like those designed for "risk sharing" like VC or early-stage grants – these have been shown to be effective because of their signalling effects for financial markets and especially for young and small firms.
- **Third, some demand-side instruments like regulation and the carbon tax have proven to be effective for green transitions, and could have further applications.** Nonetheless, these need to be examined with caution because of the unknown long-term effects of such interventions.

These lessons can be applied by governments in a systematic manner. An efficient use of public resources in a context of contracting fiscal space, and the need for projects that achieve impact and adequate returns to investment in order to leverage domestic and foreign financing, means that structural transformation policies need mechanisms to design, monitor and evaluate their investments and efforts.

3.3 **The complementarity between different types of instruments can make or break an industrial policy.**

According to the OECD, the most salient gap in industrial policies refers to the interaction between instruments. On the one hand, there is little evidence on the cross-effects and complementarities between targeted instruments in a vertical industrial strategy. The fact that the interactions between horizontal instruments is so important (e.g., R&D subsidies coupled with skill and knowledge transfer policies) suggests that complementarities between targeted instruments can be critical (OECD, 2022b).

There is also an open question regarding the interaction between demand-side and supply-side instruments. This is even more relevant given the importance that demand has taken in so-called "mission-oriented" industrial policies, where instruments like public procurement are used in unison with expenditures and incentives to allocate resources towards high productivity sectors.

Critically, governments should aim to achieve an optimal balance between demand and supply-side instruments. Mechanisms that help articulate the policies of different government agencies, and that promote the beneficial – instead of the unintended – consequences of industrial policies are called for.

3.4 Public and private coordination is central, and a diverse group of financing actors need to be involved in structural transformation strategies.

The literature shows that governments should reduce information asymmetries to facilitate the entrance of a variety of financing actors. This can allow early-stage firms to alleviate financial constraints, and sets up a role for public development banks, VC, private-capital, and investment banking (OECD, 2022b).

The alignment of objectives and investments is also relevant between different territorial levels, given the importance of location-based industrial policies and international technology transfer. Structural transformation initiatives are growingly based on local sectoral or technological advantages which require financing from regional governments and private actors. Also, international transfer of technology and knowledge involve international firms and global actors operating in multiple latitudes.

Coordination, in turn, becomes a central feature of successful industrial policies. Given that coordination failures are often behind the nonexistence of certain key markets, and that a productive coordination between the state and private investors can result in promising endeavours of productivity growth, means that frameworks that set rules for interaction and ongoing engagement are now an important part of structural transformation policies (Mazzucato, 2011; Hausmann and Rodrik, 2002).

3.5 The risk of political capture is at the centre of the critique of industrial policies.

The risk of regulatory or policy capture by private interests has been highlighted as one of the main reasons behind the failure of industrial policy to transform economies. These failed experiences have especially occurred in Africa and Latin America and the Caribbean (Winston, 2006; Crespi, Fernandez-Arias and Stein, 2014), and in some cases structural transformation policies were abandoned for decades because of the long-lasting effects on public perception of the pervasive role that governments can take when “picking winners” or misusing public funds.

Thus, transparency becomes a key asset for structural transformation policies. This feature can be central in a context of growing distrust in government and legitimate calls for more inclusive approaches to industrial strategy.

3.6 INFF can be an appropriate tool to manage and overcome these challenges.

A comprehensive approach to financing could support governments in overcoming these challenges. The necessity of policy frameworks that support the acquisition of state capabilities, the growing complexity of industrial policy financing instruments, the arise of a diversity of financial actors in promoting structural change, the importance of complementarities between different typologies of instruments, and the need to mitigate risks of political capture all call for a comprehensive and integrated approach to putting industrial policies in place.

Among other policy options, integrated frameworks for financing have the potential to serve as effective implementation mechanisms. INFF can be an effective way to put in place a comprehensive strategy that integrates an understanding of complementarities, internalises action areas and sources of financing, implements monitoring and evaluation to provide transparency and impact evidence, and provide guidance for Governments that need to balance and optimise as they gain capabilities and learn (UN DESA, 2022).

4.0 How can countries implement a financing strategy for their structural transformation policies?

Investments and their financing are at the heart of structural transformation policies. By placing the frameworks, adequate market interventions and required public goods, industrial policies manage to unlock private investment, and hence they need to be in tune with the conditions for FDI, portfolio and other capital inflows from foreign markets, as well as domestic investment and entrepreneurial resources.

A financing strategy should understand the action areas of a diverse set of financing actors, map specific policy instruments to each of these action areas and design funding strategies for each instrument which effectively involve the relevant actors. The purpose of this section is to propose guidance and a basis for a financing strategy built on the INFF framework.

INFF functions around the seven areas of the Addis Ababa agenda. We use these to set the action areas for public and private financing actors, ranging from domestic public resources, international finance, macro, and trade to international cooperation and technology. Based on these, we first build a non-comprehensive structural transformation policy toolkit. Second, we map the instruments in the toolkit to each of the action areas. And third, we develop guidance for each instrument on its rationale and importance, its funding mechanisms and alternatives, and a recommendation on the stage of development in which the instrument is more relevant.

First, we use an OECD framework to build the structural transformation policy toolkit. The OECD Initiative for Structural Change Policies has proposed a broad analytical framework constructed on the formulation process of industrial policies (OECD, 2022a), which can serve as a basis for adapting an INFF approach to structural transformation policies.

According to this framework, the policy toolkit of a structural transformation policy includes two types of scopes (Figure 2):

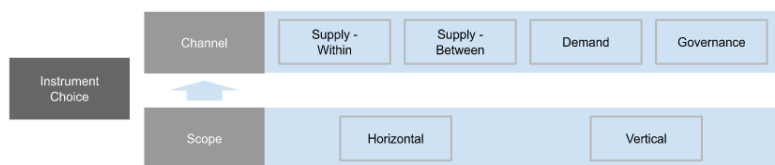
- **Horizontal strategies:** Instruments that change incentives economy-wide and are not limited to a specific industry or technology.
- **Targeted or vertical strategies:** Instruments that address market failures for a specific industry or have a deliberate technological bias.

Also, it highlights that the policy toolkit can function through three types of channels (Figure 2):

- **Supply-side policies:** Policies that affect domestic production decisions, regardless of where consumption takes place. There are two types:

- "Within" policies: Those that seek to enhance the performance of existing industries and sectors by making them more productive.
- "Between" policies: Those that seek to recompose the relative importance of industries in the economy, by enabling the shifting of resources towards growing industries and sectors that are more productive.
- **Demand side policies:** Policies that affect domestic consumption decisions, regardless of where production takes place. They seek to foster the demand of products that are produced by more productive industries and firms.
- **Governance strategies:** Mechanisms to evaluate and do regular re-assessments of policies.

Figure 2. Instrument options in the structural transformation policy toolkit.



Source: Adapted from OECD, 2022a.

As a complement to these, we include an extra set of instruments that promote equality in the labour market. These that can play an important role in integrating inclusiveness into the industrial policy toolkit. Specifically, instruments that target inequality at the "production" stage of the economy (Figure 3) should be incorporated to help balance the unintended effects that shifts to high-productivity sectors can have on inequality (Rodrik, 2022).

Figure 3. Instruments to promote equality in "good jobs" industrial policies.

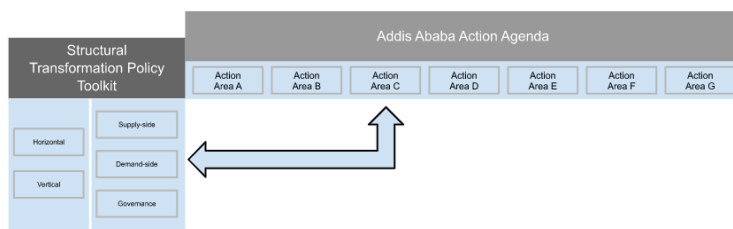
		At what stage of the economy does policy intervene?		
		Pre-production	Production	Post-production
What kind of inequality do we care about?	Bottom	endowment policies (health, education); UBI	minimum wage; job guarantee;	transfers (e.g. EITC); full-employment macro policies
	Middle	public spending on higher education	industrial relations and labour laws; industrial and innovation policies	safety nets, social protection
	Top	inheritance/estate taxes	competition policy	wealth taxes

Notes: UBI is universal basic income. EITC is earned income tax credit.

Source: Rodrik, 2022.

Second, we map linkages between the instruments in the structural transformation policy toolkit and the action areas of the Addis Ababa Action Agenda. This helps to identify the relevance of different types of instruments in particular financing areas, and to understand the role that financing actors can have for each initiative (Figure 4).

Figure 4. Mapping from the structural transformation policy toolkit to the Addis Ababa action areas.



Source: Authors.

Third, we develop guidance for each instrument on its rationale and importance, its funding mechanisms and alternatives, and a recommendation on the stage of development in which the instrument is more relevant. Specifically, we answer three questions each instrument of the Addis Agenda action areas (OECD, 2022b; MIC, 2019):

- **Why is this instrument important?** Summary of the failure or problem that the instrument seeks to resolve, the rationale for intervention and the expected outcome of funding or implementing the instrument.
- **Who pays for the instrument?** Description of the financing actors, source of resources and mechanisms to fund the implementation of the instrument. In some cases, annotations regarding relevant implementation features of the instrument and alternatives for governments are discussed.
- **When is its application more relevant?** Categorization of the stage of development in which - on a general basis - the instrument is more relevant given a nation's conditions and capabilities, to provide guidance for countries in different income levels.

As an overall result, most instruments in a modern structural transformation financing strategy take place in action area A – domestic public resources –. This is because the most common feature of industrial policies in the past decades has been the implementation of fiscal incentives or direct support via subsidies, a finding that is in line with the World Investment Report of 2018's survey on industrial policies (UNCTAD, 2018).

In parallel, this financing strategy shows that there is ample space for designing and implementing structural transformation policies outside of the fiscal sphere. For instance, a set of novel financing instruments has appeared in the scope of public development banks, which have an increasingly important role in modern industrial policies to identify and address market failures, as well as to leverage investments from a variety of actors (See below on action area A). Also, instruments that are funded through other financing channels (i.e., other action areas) can accompany domestic public expenditure and provide additional sources of dynamism and investment, something that can prove to be relevant for governments that currently face severe fiscal restrictions and need to promote growth in a sustainable manner.

Given the range of instrument options, countries in different stages of development have a robust set of alternatives. Policymakers can design an appropriate policy mix that addresses the problems and failures that they have diagnosed in their initial assessment, and as they gain capabilities, governments can introduce instruments that require newly acquired technical, political, and private-sector capacities.

Finally, it is notable that there are commonalities and overlapping between action areas, especially with the science, technology, and innovation action area. STI policies have become a central set of instruments because of their role in developing capabilities in firms and sectors, and because of the importance that knowledge and innovation have gathered in industrial policies that take place a global context of competition, trade integration and technological change.

The financing strategy that results from of this exercise are-is presented according to each Addis Ababa action area in the following sections, and throughout the policy toolkit we highlight those instruments that have a strong link with environmental sustainability and inclusion, by flagging those cases in which there is a relevant implication for SDGs 5 (gender equality), 7 (affordable and clean energy), and 8 (decent work and economic growth). All instruments in the policy toolkit are associated with SDG 9 (industry, innovation, and infrastructure).

4.1 Action area A: Domestic public resources

The domestic public resources action area includes instruments related to public expenditure and investment, tax systems, and public development banks. This section provides guidance for instruments that are financed by fiscal resources, either through public expenditure programs and investments or through the tax system. Also, it addresses instruments that pertain to public development bank, a figure whose role has changed throughout the decades.

On the one hand, public expenditures and the tax system are the main field of action for modern industrial policymaking, because of the prevalence of support subsidies and tax incentives. Programs based on public expenditures can either fund the provision and access to key inputs for firms (which, in principle, functions as the funding of a public good) or intervene with incentives


that seek to share the costs of risky or uncertain investments (i.e., a market-based intervention to address a market failure) (see Table 1; UNIDO, 2015; and OECD, 2022a). Tax incentives can also share the costs of risky endeavours or change the relative prices of inputs and investments by decreasing the tax base for firms, and hence reducing their fiscal costs of carrying out those productive expenditures (Table 2). However, these fields are inherently constrained by a country's fiscal space and ability to acquire debt and finance its budget in a sustainable manner.

On the other, modern development banks can play a pivotal role in orchestrating public and private resources in the financing strategy. As Fernández-Arias et al. (2019) argue, development banks can lead the identification of market failures through their routine activities of loan-screening and lending, and can use this critical information to provide inputs for the design of other structural transformation policy instruments. This orchestrating role can accompany their more traditional place in addressing financial constraints and crowding-in a diverse set of financing actors (see Table 3).

Most of these instruments seek to increase business investment in tangible or intangible assets, or to promote the expenditures in R&D and innovation. Therefore, a large share of the instruments featured in this action area overlap with action area G of STI policies (section 4.6), where financing actors convene to foster research capabilities, the development of new technologies or the adaptation of existing ones, and the introduction of innovative products to market as a strategy based on capacity-building.


~~Modern development banks can play a pivotal role in orchestrating public and private resources. As Fernández-Arias et al. (2019) argue, development banks can lead the identification of market failures through their routine activities of loan screening and lending, and can use this critical information to provide inputs for the design of other structural transformation policy instruments.~~

Table 1. Guidance on public expenditure and investment.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Investment in STEM skills 	<ul style="list-style-type: none"> • Countries with low performing higher education systems and training settings often lack important skills in their labour force. • Skills in science, technology, engineering and mathematics (STEM), together with complementary skills in management, have shown to be essential conditions for productivity growth and innovation (OECD, 2022b). • Public expenditure in high quality public and private training programs can increase the supply of talent needed for structural transformation, as well as increase the probability of employment in higher-wage sectors. • Hence, the instrument is a public good that provides access to inputs. 	<ul style="list-style-type: none"> • Investment for STEM skill programs is traditionally channelled to training institutions or university programs. • The source for expenditures generally comes from the national government's budget. • In some cases, local or state governments can fund these agencies, and in others, private sector associations can fund training programs that seek to be clearly aligned with firm demands (case of Brazil). • <u>Policies should account for training of often excluded groups, like women or minorities.</u> 	Least developed countries
	Investment in National Quality Infrastructure (NQI) for standardisation	<ul style="list-style-type: none"> • Low availability of infrastructures required for standardisation (laboratories, testing facilities, etc.) can inhibit firms from investing in export capabilities or innovation. • Public investment in the NQI can provide tools for firms to carry out standardisation and homologation (Cirera and 	<ul style="list-style-type: none"> • Most accredited facilities in the NQI of a low or middle income country will be funded by public expenditures from the national government's budget. • In some middle income countries or in developed nations where demand for export or technological services is high, privately funded laboratories are a 	Least developed countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<p>Maloney, 2017).</p> <ul style="list-style-type: none"> Hence, the instrument is a public good that provides access to inputs. 	<p>common feature.</p>	
	Investment in basic research infrastructure	<ul style="list-style-type: none"> Deficiencies in basic capacities and facilities for research are associated with ineffective R&D agendas in universities and research institutions, as well as low applied R&D capacity in firms. Public expenditure in research laboratories and PhD training and attraction programs, especially those aligned with industry needs, is a pillar of public R&D funding in virtually all successful structural transformation cases (as in South Korea). Hence, the instrument is a public good that provides access to inputs. 	<ul style="list-style-type: none"> Most basic research infrastructure is funded by public expenditures, especially in lower stages of development, resulting in the fact that public expenditures make up most of low-income countries' R&D intensity as a share of GDP. In upper stages of development, private investment in facilities and talent for research tends to increase as a share of total R&D. Therefore, industry associations and private firms become key actors in the financing strategy. 	Middle-income countries
	Grants and vouchers for collaborative innovation projects	<ul style="list-style-type: none"> A lack of alignment in R&D priorities between firms and universities or research institutions can result in scarce technology transfer and suboptimal investments in innovation ventures. Grants for innovation projects that are carried out jointly by firms and academia can increase investment in R&D activities with direct market application. Also, public expenditures in vouchers (defined as a partial grant for firms to hire innovation services) can foster collaboration in innovation projects (as in the UK or Colombia). Hence, the instrument is a market-based intervention. 	<ul style="list-style-type: none"> Grants for innovation projects are often expensive to run because of the due diligence process and infrastructure needed to implement calls for proposals, evaluation and disbursement. Traditionally, the costs of the subsidies -including the implementation costs- are financed by a variety of government levels, but most financing is sourced from the national government's budget through ministry agencies and programs. On the other hand, vouchers for innovation projects only partially fund the cost of the initiative and can be designed in a way that reduces strain at the evaluation stage. The fact that firms partially cover the costs of the service incentivizes that efforts are aligned with the firm's needs. The subsidised component of vouchers is funded through public expenditure programs. 	Middle-income countries
	Grants and subsidies for private and public R&D	<ul style="list-style-type: none"> The existence of knowledge spillovers and the nature of research as a public good leads firms to invest suboptimally in R&D. Grants and subsidies for R&D in private or public administrations have been shown to increase firm performance and R&D outcomes by sharing the costs and risks of innovation (OECD, 2022b). The effect of subsidies seems to be greater on investments in research than on development and market experimentation (see next column). Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> Grants and subsidies are often expensive because of the due diligence process and infrastructure needed to implement calls for proposals, evaluation and disbursement (and generally more expensive than a tax credit for R&D - OECD, 2022b). On the other hand, direct subsidies appear to have more funding additionality than tax credits, and seem to be more effective in promoting research (Ibid). Grants and direct subsidies are funded by public expenditures from a variety of government levels, but most financing is sourced from the national government's budget through ministry agencies and programs (as is the case of the United States federal R&D agencies) 	High-income countries
Demand-side	Public procurement for R&D	<ul style="list-style-type: none"> As mentioned above, firms can invest suboptimally in R&D when faced with uncertainty regarding the appropriation of profits that result from their inventions and the size of the market for their products. The government purchase of innovative goods and services - which is done primarily to meet demands by the public sector - can have secondary effects of fostering R&D in firms by signalling the existence of demand for their products and by partially funding their research activities through the contracts that result from successful tenders. Governments must be aware of the difficulties and risks of setting up procurement processes for innovation (see next column) (OECD, 2022b) Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> Public procurement naturally proceeds from the budgetary allocations to the agency that sets up the tender. Therefore, the financing will come from the national or local government's budget. Given the difficulty of setting up a process of public procurement for products or services that are not available in the market, researchers recommend that tenders are structured around needs and not around technologies (Ibid). This involves creating state capacity in the procuring agencies. Also, there is a risk that public procurement for R&D induces the development of products that are too narrowly focused on public sector needs and that do not have a broader market application. Hence, it is recommended that governments use public procurement for R&D in areas in which the government encompasses the final demand (e.g. defence or infrastructure) (Ibid). 	High-income countries
Governance	Recurrent impact evaluation of public expenditure programs	<ul style="list-style-type: none"> In a context of reduced fiscal space, the opportunity costs of public expenditures becomes a central issue. At the same time, structural transformation policies use public resources to invest in activities that are high-risk and experimental by nature (e.g. R&D projects). For both of these reasons, national financing strategies benefit from having recurrent feedback mechanisms that promote learning, adjusting and understanding the direction in which public spending has the most impact. The development of INFF is usually informed by a variety of assessments and diagnostics, including the use of public expenditure reviews and impact evaluations (UN DESA, 2022). This instrument is a governance mechanism that seeks to introduce learning and monitoring. 	<ul style="list-style-type: none"> Impact evaluations and public expenditure reviews can be financed by the national budget. However, rigorous impact evaluations or review studies are resource and time-intensive, which means that most LDCs and even middle-income countries tend to prioritise investing in other, more seemingly urgent areas of policy, leading governments to under-invest in evaluation. In consequence, there is a general opportunity for international cooperation from donors and multilateral development banks, which can use non-refundable facilities to fund strategic impact evaluations that help build capabilities in these countries, develop tools to inform the overall structural transformation strategy, and produce evidence around the best uses of limited public resources. 	Overall relevant

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
	Public and private fora to monitor investment performance	<ul style="list-style-type: none"> Government-led investments in structural transformation (especially those done through public incentives for firms) carry performance and transparency risks. On the one hand, public agencies do not specialise in the talent and methods that private organisations (like VC or private capital funds) have to assess project proposals or business models. On the other, private stakeholders can be wary of the incentives that are at play when public officials select the beneficiaries of investments. Therefore, mixed fora in which public officials and private sector representatives meet to monitor the performance of public investment in programs for structural transformation can help create capabilities in public agencies as well as increase trust and transparency in the process of allocating public funds. This instrument is a governance mechanism that seeks to introduce accountability and transparency. 	<ul style="list-style-type: none"> A public-private forum generally does not require significant funding, and activities like those of a secretariat and logistics can usually be co-financed by the hosting public agency and/or a hosting private organisation. 	Overall relevant
Vertical Scope				
Supply-side	Management and technology extension programs	<ul style="list-style-type: none"> Low absorption capacity in firms is usually associated with a lack of managerial abilities and technological literacy within companies. Management extension programs provide training and assistance to increase managerial capacity. Technology extension programs provide support for adoption of modern techniques and technologies. Extension programs can be targeted to specific industries, as has been usually the case in agriculture, but growingly in manufacturing and services. Hence, the instrument is a 'sectoral public good' (meaning a public good for actors within the targeted sector or co-benefited from it), and provides access to inputs. 	<ul style="list-style-type: none"> Funding of management and technology extension programs is generally done by multiple actors, involving public expenditures from national or federal budgets, public expenditures from local or state governments, and private resources from beneficiary firms. The importance of public expenditures tend to be greater in low and middle-income countries where firms face information asymmetries and tend to under-invest in extension services (as in Morocco or Chile). Private funding tends to increase in high-income nations (as in Japan or the US) 	Least developed countries
	Technology-specific STEM skills mapped by industries	<ul style="list-style-type: none"> STEM skills can be specific to technologies that are used in an industry, and, therefore, sectors can have demand for different engineering or scientific competencies. Public expenditure in high quality public and private training programs that are tailored for those technology-specific skills can increase the supply of specialised talent needed for "between" sector productivity growth, as well as increase high-wage jobs. Hence, the instrument is a sectoral public good that provides access to inputs. 	<ul style="list-style-type: none"> Investment for sector STEM skill programs is traditionally channelled to training institutions or university programs. The source for expenditures can partially come from the national government's budget. Local or state governments can also fund these agencies. Private sector associations can fund both the training programs and the mapping of skills needed in a specific sector. 	Middle-income countries
	Targeted business investment subsidies	<ul style="list-style-type: none"> Apart from knowledge assets which are produced through R&D, tangible assets can also be affected by market failures and externalities. However, evidence on the effectiveness of non-R&D incentives is scarce (OECD, 2022b). Most business investment incentives seek to alleviate credit constraints that arise from failures in financial markets, which is done through banking instruments (see Table on Public Development Banks for these instruments). However, some countries have sought to alleviate market failures that affect specific sectors (e.g. agriculture) or geographical regions through targeted investment subsidies (e.g. Special Economic Zones). It is important to note that the limited evidence available shows that investment subsidies tend to have significant effects on output growth and employment, specifically in small firms; however, there is no clear evidence of additionality in larger firms nor in productivity (TFP or labour). Also, there is evidence that subsidies that are targeted too narrowly can produce adverse effects (e.g. subsidies for capital formation can induce firms to reduce investment in intangible capital) (Ibid). This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Governments must be aware of the limitations and possible unintended effects of pursuing targeted subsidies for investments (e.g. effects on competition or excluded firms), unless there is a clearly defined market failure and an instrument that addresses the mechanisms at play, especially in a context of limited fiscal resources in which funds could be directed to more broadly impactful programs. Therefore, these instruments require capabilities in the public agencies that adopt them. One way to build capacity for targeted incentives is to carry out a first phase in which the investment subsidy is horizontal, then evaluate what are the characteristics of the beneficiaries where the policy has the most impact, and then carry out a second phase where the incentive is targeted to those. In this targeted phase, the whole industrial ecosystem surrounding the selected sector (e.g. key upstream and downstream firms or adjacent service providers) should be included in the instrument. Investment subsidies have been traditionally funded by the national government's budget. 	Middle-income countries
	Targeted research infrastructure	<ul style="list-style-type: none"> Even though public expenditure in research laboratories and PhD training and attraction programs are a common feature of successful structural transformation policies, fiscal restrictions can limit a country's ability to pursue a strategy that has enough "critical mass" in these types of investments. Therefore, one alternative for low or middle-income countries is to embark on public expenditure programs to provide access to research infrastructure for selected sectors or areas of R&D. Nonetheless, governments need to be aware of the limitations and risks of such an approach (see next column). The instrument can be considered a sectoral public good that 	<ul style="list-style-type: none"> As mentioned above, basic research infrastructure is mostly funded by public expenditures in lower stages of development. In this context, governments must be aware of the limitations they face when pursuing targeted expenditures given the difficulty of identifying which areas of research or technology development are the most promising in any given time and location (Thun et al., 2022). One way to address this is to carry out "horizontal" or broadly based investments, and then target the program in a second phase on those sectors or areas 	Middle-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		provides access to inputs.	that showed to have the most impact in terms of additional funding or research outputs on the first phase (OECD 2022b).	
	Place-based grants for R&D and innovation	<ul style="list-style-type: none"> Place-based strategies are increasingly common in modern structural transformation policies because comparative advantages for trade are often connected to features of a location (as in the view of cluster competitiveness in the Porter sense). In line with this, grants for R&D and innovation are sometimes tailored according to regional priorities and level of specialisation, as is the case with the European Union's S3 platform or the cluster strategies that are prevalent in Latin America (Llínas, 2021). There is strong evidence that subsidies and grants for R&D increase firm outcomes in small and young firms (including effects on patents, VC funding and early-stage survival) (OECD, 2022b). This suggests that these subsidies help address information asymmetries that exist for investors and firms. It is notable that the mechanism through which these subsidies seem to work (solving information asymmetries) could be addressed by other, less costly alternatives to R&D subsidies (see next column). This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Grants and subsidies for R&D are funded by public expenditures from a variety of government levels, with most financing coming from the national government's budget. However, in the case of place-based incentives, there is an opportunity to leverage national funds with co-financing from local governments and private organisations (for example, those that support cluster initiatives). Also, given that targeted grants seem to work mostly by "crowding in" private investment, governments could consider complementing or substituting these subsidies with financial instruments designed to address information asymmetries for small and young firms in VC or banking, and which are less costly in terms of public funds (see Table on Public development banks). Those financial instruments could be targeted to the locations that are affected by market failures. 	Middle-income countries
	Targeted grants for R&D and innovation 	<ul style="list-style-type: none"> Grants for R&D and innovation are sometimes targeted to sectors and industries that are prioritised because of a national economic strategy (as in South Korea), because of its important for climate change (as in the Green Deal and Horizon Europe programmes in the European Union), or because of strategic autonomy (as in the CHIPS and Science Act in the United States). In fact, this last case of the CHIPS and Science Act of 2022 sparked a renewed global discussion about the role of targeted subsidies for R&D and about modern industrial policies in advanced economies. In the case of LDCs or middle-income countries, fiscal restrictions can limit the ability to pursue a strategy that has enough "critical mass" in these types of investments, thereby leading governments to embark in R&D subsidy programs for selected sectors. As discussed in the place-based approach, there is strong evidence that targeted subsidies and grants for R&D increase firm outcomes, especially in small and young firms (OECD, 2022b). This suggests that these subsidies help address information asymmetries that exist for investors and firms. Hence, the mechanism through which these subsidies seem to work (solving information asymmetries) could be addressed by other, less costly alternatives to R&D subsidies (see next column). In a more general sense, R&D subsidies for sectors such as defense are described by some authors as strategic because of their technological spillovers to other sectors (e.g. software or semiconductors) (Mazzucato, 2011). In the same light, R&D grants for green energy investments have been an important feature of sustainable structural transformation policies in recent years, and subsidies for the development and manufacturing of vaccines was a key policy in addressing the COVID-19 crisis. This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Grants and subsidies for R&D are funded by public expenditures from a variety of government levels, with most financing coming from the national government's budget. In the case of governments with restricted fiscal space, it is noteworthy that targeted grants seem to work mostly by "crowding in" private investment, so public officials could consider complementing or substituting these subsidies with financial instruments designed to address information asymmetries for small and young firms in VC or banking, and which are less costly in terms of public funds (see Table on Public development banks). Those financial instruments could be targeted to the sectors that are affected by market failures. In countries with more fiscal capacity or more generally in advanced economies, programs for R&D subsidies at scale can increase productivity in strategic sectors that are deemed to have technological spillovers to the rest of the economy, or that are important for their energy transition and decarbonization objectives. 	High-income countries
Demand-side	Open innovation initiatives	<ul style="list-style-type: none"> In some sectors, firms require innovative solutions in products or in inputs that they source from upstream providers, but don't have the R&D capacities to invest in development projects for these necessities. At the same time, smaller or less established firms that could provide those solutions face credit constraints and externalities that limit their ability or willingness to invest in R&D, especially when there is uncertainty regarding the appropriation of profits that result from their inventions and the size of the market for their products. Open innovation schemes tend to solve these market and coordination failures. In this scheme, "client" firms can define and communicate their R&D needs and open a tender for proposals. "Supplying" firms can then submit development proposals for these requirements, and the client undergoes a funding contract with the selected firms to develop their project and source their required solutions (either by licensing or acquiring the invention). Government programs can have a role in fostering open innovation schemes by providing coordination for the sectors that could benefit from these initiatives, or by partially 	<ul style="list-style-type: none"> Open innovation initiatives are traditionally funded by private firms that finance, licence or acquire the solutions that were developed. An open innovation program that is sponsored by a government agency generally does not require significant public funding, apart from those that subsidise the coordination of the initiative. In some cases, however, governments can choose to partially subsidise the "client" firm's process for structuring the requirements in the tender or partially fund the R&D investments by the "supplying" firm. 	Middle-income countries


Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<p>funding activities in the process or investments in R&D by the supplying firms.</p> <ul style="list-style-type: none"> Hence, this instrument is a market-based intervention. 		
	<p>Public procurement with a technological bias</p> 	<ul style="list-style-type: none"> Throughout the past decades, some governments have sought to support their defense, strategic autonomy or climate change objectives through public procurement of R&D for specific technologies (e.g. green energy infrastructure, hydrogen production facilities, or defense technologies in general). The logic for this instrument is that public purchase of innovative goods and services – which is done primarily to meet demands by the public sector – can have secondary effects of fostering R&D in firms by signalling the existence of demand for their products and by partially funding their research activities through the contracts that result from successful tenders. Given the nature of public procurement processes that target a specific technology, governments must be aware of the difficulties and risks of setting up procurement processes for targeted technologies (see next column) (OECD, 2022b) This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Public procurement naturally proceeds from the budgetary allocations to the agency that sets up the tender. Therefore, the financing will come from the national or local government's budget. Given the difficulty of setting up a process of public procurement for products or services that are not available in the market, researchers recommend that tenders are structured around the functional characteristics that are needed from a technological breakthrough and not around the technical and material standards of these technologies (Ibid). This involves creating state capacity in the procuring agencies. Also, there is a risk that public procurement for R&D induces the development of products that are too narrowly focused on public sector needs and that do not have a broader market application. Hence, it is recommended that governments use targeted public procurement for R&D in technologies in which the government encompasses the final demand (e.g. defence or infrastructure) (Ibid). 	<p>High-income countries</p>

Table 2. Guidance on tax systems.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
	<p>Well-functioning tax codes</p>	<ul style="list-style-type: none"> Corporate rates are seen to be an important factor that determines international competitiveness and incentives for domestic investment and FDI. Nonetheless, in order to avoid a "race to the bottom", recent agreements on a global scale on a minimum tax rate of 15% signals that there is a recognition that using the tax code as an instrument for increasing business investment has trade-offs with other policy areas. Therefore, tax systems should aim more broadly to be simple, transparent, and efficient, meaning that its structure of rates, provisions and benefits help set the relative costs of labour, different types of capitals and other inputs in a way that promotes their most productive uses (OECD, 2022b). Also, tax systems affect the composition of finance in an industrial strategy (incentives to use equity vs debt financing). Moreover, the tax system and its corresponding tax authorities require capabilities to perform in a mature and agile manner, which is an important requirement for the implementation of tax incentives like the ones described in this section (Cirera and Maloney, 2017). 	<ul style="list-style-type: none"> The costs of a well-functioning tax code are not necessarily seen upfront, as government's efforts to promote fiscal efficiency usually materialise through legal reforms to the tax code. However, the costs of an efficient tax system usually lie behind the requirements of a well-functioning tax authority, one that has sufficient funding for the adequate human and technological resources, information and digital tools, audit and sanctioning capabilities, as well as political empowerment. These are all elements that should be sufficiently funded in the national government's budget. 	<p>Least developed countries</p>
<p>Supply-side</p>	<p>Tax incentives for business investment</p>	<ul style="list-style-type: none"> Tax incentives for investment can take many forms, the most common being tax expenditures through exemptions, deduction, credit or preferential rates for certain capital investments or equipment upgrading. While these instruments can promote business investment they face a trade-off in terms of tax collection for the tax authority and the national budget (see next column). One specific tax incentive that is widely used, and for which there is ample evidence of its effectiveness, is bonus depreciation. In this type of tax expenditure, businesses can accelerate the amortisation of some of their investments, helping them reduce the tax base for their corporate tax and therefore reducing the effective relative cost of capital. Bonus depreciation has been shown to increase employment, output and productivity, but also to be less effective in small firms that lack skilled labour and to induce firms to reduce the quality of their investments (OECD, 2022b), which must be taken into account by governments. This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Tax expenditures like exemptions, deductions or bonus depreciation are financed by the national government's budget, given that they represent a cost in the form of reduced tax collection. The true cost of these incentives for business investment is difficult to quantify, because governments need to assess the effective revenue forgone and compare it to the revenue that would have been collected in the absence of the incentive (that is, with decreased business expenditures in capital). At the same time, the benefits of a tax incentive need to be assessed vis-a-vis the inefficiencies of creating complexity and so-called "horizontal" or "vertical" inequalities in the tax system. Given the difficulty of accurately estimating these "true costs", governments should at least estimate revenues foregone by the tax incentive. Estimates of these revenues show that overall tax incentives (both to enterprises and households) are very large, with over 5% of GDP in foregone tax revenues in countries like Senegal, Cabo Verde, Uruguay and Armenia (Von Haldenwang & Redonda, 2021). 	<p>Middle-income countries</p>



Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
	Tax incentives for R&D	<ul style="list-style-type: none"> • Tax incentives for R&D projects can also take many forms, the most common being tax credits, but also seen in exemptions and deductions for investments in R&D. • Tax incentives for R&D in general, and more specifically in the form of tax credits, have been shown by the literature to have a positive impact in additional investment in research and development expenditures. • Governments must be aware of some of the unintended effects of these incentives when designing them. In particular, there is evidence that (in the case of a short supply of researchers and skilled workers) R&D tax credits can be absorbed by these workers in the form of higher wages instead of an increased number of researchers and research output (OECD, 2022b). Also, Cirera and Maloney (2017) highlight that the positive effect occurs mostly in large firms, and there is a possibility that small firms register expenditures in non-R&D activities as if they were R&D (called a relabelling effect). • This instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Tax incentives for R&D are financed by the national government's budget, given that they represent a cost in the form of reduced tax collection. • Some countries also support R&D through subnational tax incentives, as is the case of Canada (OECD, 2021). • The true cost of these incentives for R&D is difficult to quantify, because governments need to assess the effective revenue forgone and compare it to the revenue that would have been collected in the absence of the incentive (that is, with decreased expenditures in R&D). • Given the difficulty of accurately estimating these "true costs", governments should at least estimate revenues foregone by the R&D tax incentive. In the European Union, tax support for R&D was estimated at 0,1% of GDP in 2019 (Ibid). 	High-income countries
Governance	Public reports on the scale of tax incentives as well as adoption and effectiveness	<ul style="list-style-type: none"> • The correct quantification of the fiscal costs and estimated benefits of tax incentive schemes is critical for accountability and evaluation of the use of these instruments in the tax system. • Tax authorities and Ministries of Finance should aim to produce routine reports on the scale of tax incentives as well as its measured adoption and effectiveness. 	<ul style="list-style-type: none"> • Tax incentives reports do not require significant funding, although its measurement requires adequate capacities within the tax authority agency and the Ministry of Finance. • International bodies could provide assistance to governments in adopting standardised methods for accounting of tax support for businesses. 	Overall relevant
Vertical Scope				
Supply-side	Sector-specific tax incentives or incentives with a technological bias	<ul style="list-style-type: none"> • Tax incentives for business investment or R&D are sometimes targeted to sectors and industries that are prioritised because of a national economic strategy, because of its importance for climate change, or because of strategic autonomy. In the case of LDCs or middle-income countries, fiscal restrictions can limit the ability to pursue a strategy that has enough "critical mass" in these types of tax expenditures, thereby leading governments to embark incentives for selected sectors only. • As discussed above, tax incentives for investment and R&D in sectors have been shown to increase employment, output and productivity. However, they have been found to be less effective in small firms that lack skilled labour and to induce firms to reduce the quality of their investments (OECD, 2022b), which must be taken into account by governments. • Also, they induce "horizontal" inequalities in the tax code between economic sectors, and pose the same risks as sector-based subsidies, in that they can impede competition or have unintended consequences (see next column). • This instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Governments must be aware of the limitations and possible unintended effects of pursuing targeted tax incentives (e.g. effects on competition or excluded firms), unless there is a clearly defined market failure that can be addressed by the tax incentive, especially in a context of limited fiscal resources in which funds could be directed to more broadly impactful programs. Therefore, these instruments require capabilities in the public agencies that adopt them. • Also, targeted tax incentives induce "horizontal" inequality in the tax code as they mean that firms that are comparable but only differ in the sector that they belong to will face different corporate tax rates. • Finally, governments must be aware of the difficulty of identifying which sectors or areas of technology development are the most promising in any given time and location (Thun et al., 2022). • One way to solve this and build capacity for targeted tax incentives is to carry out a first phase in which the tax expenditure is horizontal, then evaluate what are the characteristics of the beneficiaries where the policy has the most impact, and then carry out a second phase where the incentive is targeted to those. In this targeted phase, the whole industrial ecosystem surrounding the selected sector (e.g. key upstream and downstream firms or adjacent service providers) should be included in the instrument. • Tax incentives for specific sectors are financed by the national government's budget, given that they represent a cost in the form of reduced tax collection (though the same caveats as in horizontal incentives apply). 	Middle-income countries
Demand-side	Green taxes 	<ul style="list-style-type: none"> • Green taxes, like carbon emission or fuel taxes, can foster innovation and technological change from the demand side. • There is evidence that a tax that affects the price of a good with high carbon content (like fuel) induces greater green patents in firms affected by the price hike (OECD, 2022b). • In general, the literature shows that these types of market interventions are more effective at fostering green innovation than strict regulation and control measures (Ibid). • This instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Green taxes are a mechanism to finance green investments and innovations, whose costs are borne by private firms that are affected by the price change induced by the tax. In turn, tax collection arising from the taxed good is a source of revenue for the government. • However, it must be noted that if the policy objectives of the green tax are met, its fiscal revenues should fall over time given the transition to greener technologies. 	Overall relevant

Table 3. Guidance on public development banks.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Facilities and loans for firm upgrading (equipment, export market, etc)	<ul style="list-style-type: none"> • Constraints and barriers to credit inhibit firms from upgrading investments. • Second-floor facilities and loans (which are funded by a public development bank and channelled through private banking institutions) can help alleviate barriers and enhance access to credit for productivity-enhancing investments like equipment and preparation for exporting to new markets. • Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Second-floor facilities and loans are generally funded by the public development bank's equity and deposits. 	Least developed countries
	Loan guarantees	<ul style="list-style-type: none"> • Nascent firms, as well as informal firms that seek to upgrade, face credit access barriers because of missing, insufficient, or uncertain collateral. • Loan guarantees serve as a pledge to cover a part of the debt in a loan, transferring the risk to the public development bank. • Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Guarantees can be funded by a special vehicle that is financed by the public development bank and/or expenditures from the government. 	Least developed countries
	Public equity finance	<ul style="list-style-type: none"> • Early-stage firms that operate in an environment with weak or nascent venture capital (VC) and private banking industries can face barriers to financing and growth. • Public development banks can develop mechanisms to address these gaps in early-stage financing. However, direct equity investment is not a recurrent feature in modern development banks because of the risks of political capture and conflicts of interest. • Alternative, more safeguarded mechanisms have been developed, for instance through the 'funding of funds' in which development banks make capital investments in VC or private equity funds, but maintain those institution's independent assessment and due diligence practices. • Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Capital investments in VC or private equity funds can be funded by the public development bank's equity. 	Middle-income countries
	Issuing of thematic bonds (e.g. green or social bonds)	 <ul style="list-style-type: none"> • Green investments in climate related technologies or social investments that generate better jobs have positive externalities that are not typically internalised by private banking institutions when issuing debt. • A public development bank can issue thematic bonds in private or public bond markets with a pledge to finance these types of investments. These are sometimes referred to as green or social bonds. • These resources can leverage increased loan availability for these types of projects. • Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Public and private bond markets are the sources of funding of the green and social bonds. 	Middle-income countries
Governance	Public and private composition of development bank board of directors and other executive fora	<ul style="list-style-type: none"> • The nature of public development banks -one in which public resources are used in a modus-operandi in which individuals make banking and investment decisions, akin to their private banking counterparts- makes them vulnerable to heightened moral risk, conflicts of interest and even corruption. In fact, many countries have suppressed these kinds of organisations because of pitfalls in these dimensions. • Therefore, modern public development banks that embark on instruments like the ones described in this section should structure mechanisms to guarantee transparency and accountability (knowing, of course, that risk is an inevitable element of its banking business). • One such mechanism is to set up a mixed board of directors that includes independent representatives from private sector and civil society organisations, as well as including external and independent members in other executive fora. 	<ul style="list-style-type: none"> • A public-private board of directors, and other mechanisms for transparency and accountability, generally do not require significant funding, and recurring activities can be financed by the development bank's operational resources. 	Overall relevant
	Adoption of world-class standards of corporate governance	<ul style="list-style-type: none"> • Another mechanism to prevent the kinds or heightened risks that public development banks face is the adoption of world-class standards for corporate governance. • These guidelines include standards to: select and oversee personnel; operate the bank's business on a day-to-day basis; meet shareholder obligations, and take into account the interests of other recognised stakeholders; align corporate culture, corporate activities and behaviour with the expectation that the bank will operate in a safe and sound manner, with integrity and in compliance with applicable laws and regulations; and establish control functions (BIS, 2015). 	<ul style="list-style-type: none"> • The adoption of corporate governance standards generally do not require significant funding, though they should be accompanied by initial investment in expert consulting, talent recruiting and internal reforms that could be funded by the development bank's operational resources. 	Overall relevant
Vertical Scope				
Supply-side	Sector-specific facilities and guarantees	<ul style="list-style-type: none"> • Constraints and barriers to credit inhibit firms from upgrading investments, and the intensity of these constraints can be differential across sectors (e.g. agriculture). 	<ul style="list-style-type: none"> • Second-floor facilities and loans are generally funded by the public development bank's equity and deposits, and guarantees can be funded by a special vehicle that 	Middle-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<ul style="list-style-type: none"> • Second-floor facilities and loans (which are funded by a public development bank and channelled through private banking institutions) and guarantee schemes can help alleviate barriers and enhance access to credit for productivity-enhancing investments like equipment and preparation for exporting to new markets in these sectors. • However, the bank's management and government directions must be cognizant of the risks of market interventions that benefit a sector in a differential manner, in that they can impede competition or have unintended consequences (see next column). • This instrument is a market-based intervention. 	<ul style="list-style-type: none"> is financed by the public development bank and/or expenditures from the government. • Given the risks associated with market interventions for a specific sector (e.g. effects on competition or excluded firms), credit officers should explicitly study if there is a clearly defined credit market failure that can be addressed by the instrument. Therefore, these instruments require capabilities in the public development bank. • Also, corporate governance policies should highlight the practices and conditions to be followed when targeting financing facilities to specific sectors, so as to provide transparency and reduce the risk of the government "picking winners". 	

4.2 Action area B: Domestic and international private business and finance


[The domestic and international private business and finance action area includes instruments related to financial sector development and investment policies.](#) This section provides guidance for instruments that are financed through the domestic and international banking and financial sector, highlighting some key framework conditions for financial sector development.

[In general, the financing strategy for private business and finance revolves around the framing of enabling conditions for financial and banking development. The adequate legal and regulatory frameworks for competition, capital markets and banking, including requirements for targeted investment in societally desirable areas like green financing, constitute the platform in which financial institutions can develop their role in financing the productive investments that are key for structural transformation. This can be coupled with supervisory capabilities in government and the adoption of best practices in corporate governance to assure efficiency and transparency \(Table 4\).](#)

[Given that this guidance focuses on framework conditions, they are mostly relevant for LDCs, other low-income and middle-income countries. Nonetheless, some important features like banking supervision and world-class standards of corporate governance can still be strengthened in more advanced economies.](#)

Table 4. Guidance on financial sector development and investment policies.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Competition legislation and supervision	<ul style="list-style-type: none"> • Antitrust laws, competition rules and national competition authorities have a critical role in maintaining the beneficial market incentives that competition creates for productivity and investment, through free entry and exit of markets, and control of market power (e.g. antitrust review of mergers and acquisitions). • Product regulations can also affect competition. On the one hand, product market regulations that are too restrictive can create barriers to entrepreneurship and limit allocation of capital between sectors. Pro-competitive product regulation, on the other hand, promotes structural change by fostering technology and knowledge diffusion to new firms that can catch up to leading ones (OECD, 2022b). • This instrument is a framework condition that affects market incentives and access to inputs for firms. 	<ul style="list-style-type: none"> • Competition legislation requires efforts in legal and regulatory reforms. The costs of these reforms are usually hidden, so authorities should carry out Regulatory Impact Assessments (RIAs) to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits. • In addition, competition supervision by national authorities is a resource intensive public function, one that requires funding from the national government's budget. 	Least developed countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
	Capital market legislation and supervision	<ul style="list-style-type: none"> Capital markets that function adequately can reduce financial constraints for private capital and R&D investments. In particular, they affect the composition of finance in an industrial strategy (equity vs debt), competition in financial markets and conditions for the environment in which businesses operate (OECD, 2022b). On a macro level, capital market development is associated with access to long-term currency, reduced reliance on foreign currency and diminished risks from volatility and financial instability. This instrument is a framework condition that affects market incentives and access to inputs for firms. 	<ul style="list-style-type: none"> Capital market legislation requires efforts in legal and regulatory reforms. The costs of these reforms are usually hidden, so authorities should carry out RIAs to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits. In addition, ex-post supervision is a resource intensive public function, one that requires funding from the national government's budget. 	Middle-income countries
	Bank regulation and supervision	<ul style="list-style-type: none"> As a complement to capital market legislation, bank regulation is an important feature in structural transformation policies because of the role of the banking sector in financing and alleviating credit constraints in growing sectors and firms. Also, because an effective banking framework promotes competition between banks. In addition, effective bankruptcy legislation is an important element of a well-functioning banking system. Lastly, banking supervision has become an important feature for macroeconomic conditions given its role in safeguarding financial stability. This instrument is a framework condition that affects market incentives and access to inputs for firms. 	<ul style="list-style-type: none"> Gaining efficiency and competition in the banking system requires efforts in legal and regulatory reforms. The costs of these reforms are usually hidden, so authorities should carry out RIAs to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits. In addition, ex-post banking supervision is a resource intensive public function, one that requires funding from the national government's budget. 	Overall relevant
Governance	Adoption of world-class standards of corporate governance	<ul style="list-style-type: none"> An effective mechanism to prevent the risks that are embedded in the financial sector is the adoption of world-class standards for corporate governance. These guidelines include standards to: select and oversee personnel; operate the institution's business on a day-to-day basis; meet shareholder obligations, and take into account the interests of other recognised stakeholders; align corporate culture, corporate activities and behaviour with the expectation that the institution will operate in a safe and sound manner, with integrity and in compliance with applicable laws and regulations; and establish control functions (BIS, 2015). Governments typically produce regulatory standards for the certification of financial institutions that include requirements for corporate governance. 	<ul style="list-style-type: none"> The adoption of corporate governance standards is financed by private institutions. 	Overall relevant
Vertical Scope				
Supply-side	Regulatory requirements for green financing or other targeted areas 	<ul style="list-style-type: none"> Green finance (defined as financial flows to sustainable development initiatives, UNEP 2022) has gathered momentum globally because of the importance of directing credit, investment and insurance to projects that have environmental benefits and that face credit constraints because of risk and uncertainty, information asymmetries and other market failures and externalities. In this context, banking regulators and central banks can explore setting up regulatory frameworks that promote the channelling of financial resources to projects that develop carbon-reducing technologies, green business models or infrastructure investments that support mitigation and adaptation to climate change. In some edge cases, some countries have implemented regulatory requirements for the banking sector to channel set amounts of credit or bonds to a specific sector (as in the case of banking requirements for agriculture businesses in some Latin American countries). However, governments must be aware of the high potential inefficiencies that these types of requirements can induce in the market because of suboptimal allocation of credit across the economy. 	<ul style="list-style-type: none"> Regulation for green finance requires efforts in legal and regulatory reforms. The costs of these reforms are usually hidden, so authorities should carry out RIAs to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits. 	Least developed countries



4.3 Action area C: International development cooperation

[The international development cooperation action area includes instruments related to development cooperation, multilateral development banks, and blended finance.](#) This section provides guidance for instruments that are financed by multilateral and concessional funds, either through multilateral lending, donor resources, activities and cooperation, or blended mechanisms.

[International development and cooperation institutions can play a complementary financing role for LDCs, other low-income and middle-income countries.](#) Either in their role as lending agents for national government budgets, or in other modern mechanisms like blended finance vehicles, multilateral and development banks can support and guide long-term investments carried out by government agencies, and they can use concessional funds to leverage commercial resources that can be “brought along” to finance structural transformation initiatives (Table 5).

[Notably, these international institutions can provide governments with support to gain state capabilities.](#) Diverse forms of technical assistance provided by multilaterals, and funded by an ample group of actors including donors, can be an effective mechanism to help agencies and civil servants adopt policymaking tools and engage in learning and experimentation (for example, through the support in designing and evaluating novel instruments).

Table 5. Guidance on development cooperation, multilateral development banks, and blended finance.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Refundable facilities by multilateral banks	<ul style="list-style-type: none"> The core business of multilateral development banks lies in the issuing of financial facilities – typically loans, but also related to instruments like sovereign risk guarantees – that are refundable by the borrower country. Therefore, multilateral development banks can have an important role in identifying and structuring the types of NQJ or research infrastructures, industrial projects, energy projects, or similar initiatives that promote structural transformation, and that require either sovereign or private lending to occur. At the same time, multilateral banks can play a pivotal role in creating state capabilities in the skills required for designing and implementing structural transformation policies (e.g. techniques and guidelines to identify market failures, instrument design, legal processing, etc.), through the technical assistance that accompanies their lending facilities (especially in LDCs and other low income countries). 	<ul style="list-style-type: none"> The financing of facilities should arise from the returns to investment in the projects being funded. From the lender's side, multilateral facilities are generally funded by the bank's equity, and in some cases by donor funds. From the borrower side, instruments are repaid either through the government's debt service funds (in the case of sovereign lending) or by private entrepreneurs (in the case of private lending). 	Least developed countries
	Blended finance facilities for structural transformation projects 	<ul style="list-style-type: none"> The role of blended finance in development has gathered enthusiasm in the last decade because of the much-discussed idea of going from “billions to trillions” in development finance flows to LDCs and middle-income countries. Very much in the same way that blended finance seeks to strategically steer private capital to development projects – by doing so hand in hand with multilateral or public funds –, blended finance facilities like loans and equity investments can be directed toward the funding of initiatives in the structural transformation toolkit. Multilateral development banks can have an important role in the structuring and identification of the types of NQJ or research infrastructures, industrial projects, energy projects, or similar initiatives that promote structural transformation, and that require concessional funds to mitigate risks and make the investment feasible for private financiers (see next column). 	<ul style="list-style-type: none"> The financing of facilities should arise from the returns to investment in the projects being funded. From the lenders side, blended finance facilities traditionally use a minor amount of public or concessional funds to mitigate risks that would otherwise steer private investors away from the projects. Most of the financing comes from commercial capital. From the borrower side, blended finance instruments are repaid either through the government's debt service funds (in the case of sovereign lending) or by private entrepreneurs (in the case of private lending). Lenders that use blended finance can leverage their positions to promote industrial policies that are inclusive and instruments that lead to “good jobs” externalities. 	Middle-income countries
Governance	International cooperation on structural transformation initiatives 	<ul style="list-style-type: none"> International organisations can play a role in supporting countries in their design and evaluation of structural transformation policies. Also, they possess the technical know-how to help governments create state capabilities in the skills required for designing and implementing structural transformation policies (e.g. techniques and guidelines to identify market failures, instrument design, legal processing, etc.). 	<ul style="list-style-type: none"> Cooperation initiatives are financed by the providing or donor institutions. Donors can leverage their positions to promote industrial policies that are inclusive and instruments that lead to “good jobs” externalities. 	Overall relevant
	Non-refundable technical assistance by donors and multilateral banks	<ul style="list-style-type: none"> In the same vein, multilateral development banks can play a role in supporting countries in their design and evaluation of structural transformation policies through non-refundable technical assistance (especially for LDCs and other low income/low-income countries). 	<ul style="list-style-type: none"> Non-refundable technical assistance is financed by the multilateral development bank or donor institution. 	Overall relevant

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<ul style="list-style-type: none"> Also, possess the technical know-how to help governments create state capabilities in the skills required for designing and implementing structural transformation policies (e.g. techniques and guidelines to identify market failures, instrument design, legal processing, etc.). 		

4.4 Action area D: International trade as an engine for development

The “international trade as an engine for development” action area includes instruments related to trade and FDI policies. This section provides guidance for instruments that are financed by international trade or foreign direct investments, and discusses some key framework conditions that are needed for integration with global markets. Also, it highlights some of the past pitfalls in industrial policies, which were mostly evident on ill-fated trade instruments.

~~As a matter of fact, t~~**Historically, trade policy is the area in which most traditional industrial policy instruments resided.** Import tariffs for infant industries, export subsidies and local content requirements in trade arrangements featured heavily in the industrial policies of the 1950s through the 1970s. Even though their effectiveness has been the subject of lively academic debates – in no part because of the heterogeneity of their implementation and effects across different types of countries, economic and political models (OECD, 2022b) –, they are seldom used and are presently not available for governments given their unfeasibility under the WTO’s principles for the trading system.

~~However, m~~**Modern industrial policy instruments now tend to capitalise on its complementarity with global trade instead of protecting domestic production from it.** Most instruments in this guidance refer to either framework conditions or access to inputs that firms require to increase their access to markets and benefit from the greater demand associated with foreign markets or from the participation in regional or global value chains, which are especially relevant in LDCs, other low-income and middle-income countries (OECD, 2022b). However, other instruments that set market-based incentives or that target comparative advantages in specific sectors also feature in the guidance (Table 6).

Table 6. Guidance on trade and FDI policies.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Trade legislation	<ul style="list-style-type: none"> Trade policies have a direct effect on structural transformation because of its major implications on allocation of production factors, firm incentives to invest and innovate, and knowledge flows (Cirera and Maloney, 2017 and OECD, 2022b). There is an ever increasing body of literature that estimates positive effects of trade openness on investment, innovation and productivity, in both advanced and developing countries. This positive effect is most evident on intermediate inputs and new export products, but it is also present when assessing import competition (though with some exceptions, like the case of the United States and the negative effect of Chinese imports) (Ibid). 	<ul style="list-style-type: none"> Trade legislation requires efforts in legal and regulatory reforms. Even though trade reforms have the potential upside of the aggregate benefits discussed earlier, some of the costs of these reforms can be hidden. Therefore, authorities should carry out RIAs to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits. 	Least developed countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<ul style="list-style-type: none"> This body of evidence is a counterargument to traditional industrial policy instruments that sought to temporarily protect a sector from foreign competition (so-called 'infant industry' policies). 'Infant industry' policies have particularly negative effects when directed at upstream industries, whose products are used by domestic downstream firms. The use of free trade agreements (FTAs) has become a common feature of development trade policies, and their role in structural transformation policies seems to be related to the advantages that it poses in cases where domestic production makes part of a GVC that is shared with the FTA trade partner. This instrument is a framework condition that affects market incentives and access to inputs for firms. 		
	Import and export regulation (technical regulations and SPS measures)	<ul style="list-style-type: none"> Technical regulations for traded goods, including sanitary and phytosanitary (SPS) measures for food safety and animal and plant health, are generally introduced with consumer and environment protection in mind. However, in certain instances, lack of clarity, design quality and transparency in the set up of import or export regulations can result in technical barriers that impede foreign competition and diminish the benefits of trade. Therefore, governments should set up adequate processes for implementing and reviewing import and export regulations. This instrument is a framework condition that affects market incentives and access to inputs for firms. 	<ul style="list-style-type: none"> Technical regulations need -by definition- efforts in drafting and implementing rules that govern trade in the affected goods and services. Therefore, authorities should carry out RIAs to estimate the private costs to businesses arising from the proposed features of the regulations and compare them with the estimated benefits. 	Least developed countries
	Investment in National Quality Infrastructure (NQI)	<ul style="list-style-type: none"> Low availability of infrastructures required for standardisation (laboratories, testing facilities, etc.) can inhibit firms from investing in export capabilities or innovation. Public investment in the NQI can provide tools for firms to carry out standardisation and homologation (Cirera and Maloney, 2017). Hence, the instrument is a public good that provides access to inputs. 	<ul style="list-style-type: none"> Most accredited facilities in the NQI of a low or middle income country will be funded by public expenditures from the national government. In some middle income countries or in developed nations where demand for export or technological services is high, privately funded laboratories are a common feature. 	Least developed countries
	Standardisation	<ul style="list-style-type: none"> The shift to higher productivity sectors, the increasing role of provision for GVC and the adoption of frontier technologies across the economy has heightened the need for compatibility between systems and the assurance of quality standards. Standardisation policies seek to establish technical norms that guarantees compatibility and helps domestic firms access export markets and become suppliers in value chains. As an additional benefit, standards can help knowledge diffusion. Nonetheless, it is important to note that excessive, ill-designed or too static technical norms and standards can hurt innovation because of reduced variety or the adoption of suboptimal technologies (OECD, 2022b). 	<ul style="list-style-type: none"> The definition and design of standards require efforts in drafting and implementing rules. Therefore, authorities should carry out RIAs to estimate the private costs to businesses arising from the proposed features of the standards and compare them with the estimated benefits. 	Middle-income countries
	Special Economic Zones (SEZ)	<ul style="list-style-type: none"> The use of place-based incentives for trade through SEZ are a common feature of structural transformation policies. SEZ refers to geographically defined locations that are regulated by differential trade and sometimes tax or product regulations, with the objective of promoting the conditions for investment and productivity. In some countries, SEZ can take the form of industrial parks (which have a connotation around firm agglomeration and innovation) or free-trade zones. Like in the case of place-based incentives for investment and R&D, the benefits that arise from participating in a SEZ are akin to the benefits of the horizontal policy (in this case, firms enjoy the benefits of more effective integration with global trade or the effects of special regulations regarding R&D, investment or tariffs). However, some studies have shown that SEZ initiatives in LDCs or middle income countries can fail if the complementary framework conditions or inputs (e.g. STEM skills, competition and capital markets, banking regulation) are not developed in the country, as has been the case in Ethiopia or Uganda (Gebrewolde & Rockey, 2022 and Achoroi, 2018). 	<ul style="list-style-type: none"> Funding for SEZ is generally shared by public and private actors. In some cases, the government can set up public expenditure programs to partially fund the CAPEX of the SEZ, and the implicit costs associated with the differential incentives (tariffs, expenditures, grants, etc) come from the national government's budget. In other cases, private investors can fund both the CAPEX and OPEX of the SEZ, while public funds finance the differential incentives. 	Middle-income countries
Vertical Scope				
Supply-side	Investment in industry-specific NQI needs (export standards,	<ul style="list-style-type: none"> As mentioned above, low availability of infrastructures required for standardisation (laboratories, testing facilities, etc.) can inhibit firms from investing in export capabilities or innovation. 	<ul style="list-style-type: none"> Most accredited facilities in the NQI of a low or middle income country will be funded by public expenditures from the national government. In some middle income countries or in developed 	Middle-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
	homologation laboratories, etc)	<ul style="list-style-type: none"> • However, the costs associated with developing these infrastructures can mean that LDCs and middle-income countries choose to prioritise their expenditures on industries and sectors that are strategic for trade. • Public investment in the NQI needs for these sectors can provide tools for firms to carry out standardisation and homologation (Cirera and Maloney, 2017). • Hence, the instrument is a sectoral public good that provides access to inputs. 	nations where demand for export or technological services is high, privately funded laboratories are a common feature.	

4.5 Action areas E, F: Debt, debt sustainability and addressing systemic issues

[The “debt and debt sustainability” and “addressing systemic issues” action areas include instruments related to macro policies.](#) This section provides guidance for instruments that are financed and implemented through macroeconomic policies, and discusses some key framework conditions that are needed for [private investment and](#) aggregate productivity growth.




This action area incorporates some of the most relevant instruments for “good jobs” industrial policies. Importantly, macroeconomic instruments related to labour and employment protection, unemployment insurance or other features of the social safety net can complement other structural transformation instruments to balance the effects on inequality (Rodrik, 2002; ILO, 2015).


[Overall, the guidance on macro policies includes framework conditions for enabling productive investment combined with a set of policies that alleviate the effects of technological shifts on inequality.](#) The framework conditions relate especially to the fostering of competition, efficient market regulation, and entrepreneurship, as key enablers of “between” productivity growth resulting from the flow of resources to the most productive sectors and firms. The “good-jobs” policies feature elements of a social safety-net scheme which, combined with investment in reskilling and STEM training in action area G, can help workers accommodate to the shifting nature of structural transformation (Table 7).

[These instruments are of the utmost relevance in structural transformation policies in LDCs and other low-income countries.](#) The design and effective implementation of some of these framework conditions, as well as the social safety net policies described, are an important steppingstone for countries in lower stages of development, which can be particularly at risk from the effects that technological change can have on the labour market.

Table 7. Guidance on macro policies.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Competition legislation and supervision	<ul style="list-style-type: none"> • Antitrust laws, competition rules and national competition authorities have a critical role in maintaining the beneficial market incentives that competition creates for productivity and investment, through free entry and exit of markets, and control of market power (e.g. antitrust review of mergers and acquisitions). • Product regulations can also affect competition. On the one hand, product market regulations that are too restrictive can create barriers to entrepreneurship and limit allocation 	<ul style="list-style-type: none"> • Competition legislation requires efforts in legal and regulatory reforms. The costs of these reforms are usually hidden, so authorities should carry out Regulatory Impact Assessments (RIAs) to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits. • In addition, competition supervision by national authorities is a resource intensive public function, one 	Least developed countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<p>of capital between sectors. Pro-competitive product regulation, on the other hand, promotes structural change by fostering technology and knowledge diffusion to new firms that can catch up to leading ones (OECD, 2022b).</p> <ul style="list-style-type: none"> This instrument is a framework condition that affects market incentives and access to inputs for firms. 	<p>that requires funding from the national government's budget.</p>	
	Labour market efficiency	<ul style="list-style-type: none"> When firms and sectors face shocks (whether technological or demand shocks), jobs are one of the variables that need to adapt because of the manner-in-which-by-ay businesses allocate inputs. If workers face barriers to move to other firms and sectors, or if firms face excessive barriers in-order-to-ay lay off redundant employees, inefficiencies arise that limit productivity growth (principally because of the 'between' channel). Labour market instruments that enable mobility of workers can foster labour reallocation to the most productive sectors and jobs, knowledge transfer and diffusion, and can have beneficial spillovers in innovation. Therefore, active labour market instruments like job training, upskilling or reskilling and public employment services can play an important role in inclusive structural transformation policies. This instrument is akin to a public good that provides access to inputs. 	<ul style="list-style-type: none"> Active labour market instruments are traditionally financed by public expenditure programs from the national government's budget. Some innovative financing mechanisms have arisen in the past years, for example by the use of social impact bonds (SIB) for youth training and employment programs (like in the United States, Colombia and Spain). In a SIB, government agencies typically disburse funds contingent upon the achievement of the agreed outcomes, and the funds are used to pay the principal and interest to private investors who finance the operation. This can serve as a basis for more efficient use of public resources. 	Least developed countries
	Industrial relations and labour laws 	<ul style="list-style-type: none"> In the context of structural transformation, the shift to higher-productivity sectors can prove to be disrupting for slow-to-adjust labour markets (Rodrik, 2022). Therefore, a balanced framework for labour and industry relations, as well as adequate labour regulations are needed to address the repercussions of technical change on access to jobs and inequality. In particular, an effective and modern employment protection legislation is an important feature of an inclusive structural transformation policy. However, if the conditions of this legislation are too stringent, they can be detrimental to risk taking, innovation and reallocation of factors, important elements of the productivity growth that structural transformation policies seek to promote. 	<ul style="list-style-type: none"> Labour laws require efforts in legal and regulatory reforms. The costs of these reforms are usually hidden and determined by its design features, so authorities should carry out Regulatory Impact Assessments (RIAs) to estimate the private costs to businesses arising from the proposed features of the reform and compare them with the estimated benefits, including those to female workers. 	Least developed countries
	Minimum wage regulation 	<ul style="list-style-type: none"> As in the case of labour laws and employment protection legislation, the introduction of minimum wage regulation is a common feature to protect workers from the downward wage effects of technical change on unskilled labour compensation. Usually, the level at which minimum wages are set is seen as a key variable in determining its effect on productivity: too low, and the minimum wage is not binding in a relevant manner; too high and it pushes jobs into the informal sector and sets barriers on new investments. 	<ul style="list-style-type: none"> Minimum wage regulations require efforts in legal and regulatory reforms. The costs of these reforms are usually hidden and determined by its design features (for instance, the chosen level of the minimum wage vis-a-vis the median income in the labour market). Therefore, authorities should carry out Regulatory Impact Assessments (RIAs) to estimate the private costs to businesses arising from the proposed features of the minimum wage regulation and compare them with the estimated benefits. 	Least developed countries
	Unemployment insurance 	<ul style="list-style-type: none"> As a complement to employment protection legislation, the social safety net can also feature unemployment insurance to protect workers that are facing unemployment. Governments must be aware that the features of unemployment benefits and insurance have important consequences on its fiscal cost and its implications on productivity. If benefits are perceived to be long-lasting or exceed the marginal benefit of wages in low-skilled workers, unemployment insurance can be a disincentive for agile allocation of labour and can hinder labour market efficiency and structural transformation. Also, unemployment benefits tend to have large associated fiscal costs, which nonetheless can play a role as countercyclical macroeconomic policy (see next column). 	<ul style="list-style-type: none"> Unemployment insurance policies tend to have large fiscal costs, especially if they are robust. However, they can serve as an important tool for undergoing countercyclical macroeconomic policies in the face of aggregate demand shocks. This instrument is usually financed by public expenditures from the national government's budget. 	Middle-income countries
	Entrepreneurship policies	<ul style="list-style-type: none"> Entrepreneurs and managers of small and young firms can face information asymmetries regarding business models or access to finance (among many others), as well as barriers for firm creation. Entry support policies can alleviate these asymmetries with programs that provide information and coaching for entrepreneurs, or by eliminating administrative burdens to firm creation. Also, governments that have a mandate to promote entrepreneurship in their policies can be aware of the effects that new administrative requirements have on the ease of starting a business (see next column). This instrument is a framework condition that affects market incentives and access to inputs for firms. 	<ul style="list-style-type: none"> Entry support programs, or efforts to reduce administrative burdens, are generally financed by public expenditures from the national government's budget. In some cases, entrepreneurship support and administrative simplification can have a local application-since-application since many requirements for registration and operation of businesses occur at a local level. Therefore, subnational governments can also fund efforts to reduce burdens for entrepreneurs. 	Middle-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
	Managed expansion of supply and demand 	<ul style="list-style-type: none"> Fiscal and monetary policies affect the aggregate demand in the economy, and are the central tool of economic policy in any country. Recently, international organisations like the ILO have called for a balanced approach, in which the management of aggregate demand is "balanced" with the use of structural transformation policies or public investments in infrastructures and human capital, which expand aggregate supply (ILO, 2021). 	<ul style="list-style-type: none"> Managed expansion of supply could be seen as a summary of the different instruments reviewed in this policy toolkit. 	Middle-income countries
	Exchange rate volatility management	<ul style="list-style-type: none"> International competitiveness is partly related to the foreign currency price of traded goods and services. However, there is relative consensus that a sustained intervention in foreign exchange markets to undervalue a currency as a source of competitiveness should not be pursued in a modern industrial policy due to the heightened risks of a current account crisis, as well as the disruptions on the price of imported inputs that are key in international value chains and for domestic producers. However, some central banks have increasingly used measured, limited <u>limited</u>, and temporary foreign exchange interventions to manage short-term volatility in the value of the currency, as a macro prudential tool and a mechanism to reduce uncertainty for domestic and foreign investors, which in turn can be an important determinant of long-term <u>long-term</u> investment (ILO, 2021). This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Exchange rate market interventions are usually funded by the central bank's foreign exchange reserves, or could be set up through forms of capital controls, and therefore should be measured and communicated clearly, be limited in its scope and be temporary in order to <u>in order to</u> address short-term deviations and volatility of the domestic currency. 	Overall relevant

4.6 Action area G: Science, technology, innovation, and capacity-building


The capacity building action area includes instruments related to science, technology, and innovation (STI) policies. This section provides guidance for instruments that are financed through technology policies, including research and development [expenditures](#), and innovation [incentives](#). ~~Given that these instruments are also funded through other action areas, most of them are replicated from the guidance provided in action area A.~~

~~As mentioned above, it is notable that there are commonalities and overlapping between the STI action area and action area A. STI policies have become a central set of instruments in structural transformation strategies because of their role in developing capabilities in firms and sectors, and because of the importance that knowledge and innovation have gathered in a global context of competition, trade integration and technological change. Therefore, the guidance in Table 8 features instruments that are replicated from preceding sections.~~

~~This set of instruments refers to funding by the multiple actors that can participate in accumulating capabilities and knowledge. Both public and private, as well as domestic and international, financing actors can convene to foster research capabilities, the development of new technologies or the adaptation of existing ones, and the introduction of innovative products to market.~~

~~Finally, the guidance on STI instruments and policies provides a feasible path from lower to more advanced stages of development. Policymakers can accommodate an appropriate policy mix that addresses the market failures that they have diagnosed in their initial assessment, and as they gain capabilities, governments can introduce more complex instruments that take advantage of the innovation system's newly acquired capacities (Cirera and Maloney, 2017).~~

Table 8. Guidance on STI policies.

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
Horizontal Scope				
Supply-side	Investment in STEM skills 	<ul style="list-style-type: none"> • Countries with low performing higher education systems and training settings often lack important skills in their labour force. • Skills in science, technology, engineering and mathematics (STEM), together with complementary skills in management, have shown to be essential conditions for productivity growth and innovation (OECD, 2022b). • Public expenditure in high quality public and private training programs can increase the supply of talent needed for structural transformation, as well as increase the probability of employment in higher-wage sectors. • Hence, the instrument is a public good that provides access to inputs. 	<ul style="list-style-type: none"> • Investment for STEM skill programs is traditionally channelled to training institutions or university programs. • The source for expenditures generally comes from the national government's budget. • In some cases, local or state governments can fund these agencies, and in others, private sector associations can fund training programs that seek to be clearly aligned with firm demands (case of Brazil). • <u>Policies should account for training of often excluded groups, like women or minorities.</u> 	Least developed countries
	Intellectual property (IP) rights, patent legislation and supervision.	<ul style="list-style-type: none"> • R&D activities are affected by knowledge spillovers and externalities that lead firms to invest suboptimally in expenditures that could be copied by competitors, once their inventions come to market. • Therefore, Intellectual Property (IP) rights and its application in patent legislation, allow inventors to create a temporary monopoly for their innovations and compensate for their investments, thereby fostering the aggregate level of R&D and innovation. • In addition, patents can foster technology diffusion because they work as vehicles to "codify" knowledge (OECD, 2022b). • A balanced IP rights legislation and supervision needs to be put into place in order to foster innovation, and at the same time prevent IP protection abuse by defining clearly the type of technologies that are patentable, application costs, transparency and litigation costs (Ibid). 	<ul style="list-style-type: none"> • IP supervision is a resource intensive public function, one that requires funding from the national government's budget. • Part of this function can be financed by patent application costs covered by inventors. 	Middle-income countries
	Investment in basic research infrastructure	<ul style="list-style-type: none"> • Deficiencies in basic capacities and facilities for research are associated with ineffective R&D agendas in universities and research institutions, as well as low applied R&D capacity in firms. • Public expenditure in research laboratories and PhD training and attraction programs, especially those aligned with industry needs, is a pillar of public R&D funding in virtually all successful structural transformation cases (as in South Korea). • Hence, the instrument is a public good that provides access to inputs. 	<ul style="list-style-type: none"> • Most basic research infrastructure is funded by public expenditures, especially in lower stages of development, resulting in the fact that public expenditures make up most of low-income countries' R&D intensity as a share of GDP. • In upper stages of development, private investment in facilities and talent for research tends to increase as a share of total R&D. Therefore, industry associations and private firms become key actors in the financing strategy. 	Middle-income countries
	Grants and vouchers for collaborative innovation projects	<ul style="list-style-type: none"> • A lack of alignment in R&D priorities between firms and universities or research institutions can result in scarce technology transfer and suboptimal investments in innovation ventures. • Public expenditures in vouchers (defined as a partial grant for firms to hire innovation services) can foster collaboration in innovation projects (as in the UK or Colombia). • Hence, the instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Vouchers for innovation projects only partially fund the cost of the initiative. The fact that firms partially cover the costs of the service incentivizes that efforts are aligned with the firm's needs. • The subsidised component of vouchers is funded through public expenditure programs. 	Middle-income countries
	Grants and subsidies for private and public R&D	<ul style="list-style-type: none"> • The existence of knowledge spillovers and the nature of research as a public good leads firms to invest suboptimally in R&D. • Grants and subsidies for R&D in private or public administrations have been shown to increase firm performance and R&D outcomes by sharing the costs and risks of innovation (OECD, 2022b). • The effect of subsidies seems to be greater on investments in research than on development and market experimentation (see next column). • Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Grants and subsidies are often expensive because of the due diligence process and infrastructure needed to implement calls for proposals, evaluation and disbursement (and generally more expensive than a tax credit for R&D - OECD, 2022b). • On the other hand, direct subsidies appear to have more funding additionality than tax credits, and seem to be more effective in promoting research (Ibid). • Grants and direct subsidies are funded by public expenditures from a variety of government levels, but most financing is sourced from the national government's budget through ministry agencies and programs (as is the case of the United States federal R&D agencies) 	High-income countries
	Tax incentives for R&D	<ul style="list-style-type: none"> • Tax incentives for R&D projects can also take many forms, the most common being tax credits, but also seen in exemptions and deductions for investments in R&D. • Tax incentives for R&D in general, and more specifically in the form of tax credits, have been shown by the literature to have a positive impact in additional investment in research and development expenditures. • Governments must be aware of some of the unintended effects of these incentives when designing them. In particular, there is evidence that (in the case of a short supply of researchers and skilled workers) R&D tax credits can be absorbed by these workers in the form of higher wages instead of an increased number of researchers and research 	<ul style="list-style-type: none"> • Tax incentives for R&D are financed by the national government's budget, given that they represent a cost in the form of reduced tax collection. • Some countries also support R&D through subnational tax incentives, as is the case of Canada (OECD, 2021). • The true cost of these incentives for R&D is difficult to quantify, because governments need to assess the effective revenue forgone and compare it to the revenue that would have been collected in the absence of the incentive (that is, with decreased expenditures in R&D). • Given the difficulty of accurately estimating these "true costs", governments should at least estimate 	High-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<p>output (OECD, 2022b). Also, Cirera and Maloney (2017) highlight that the positive effect occurs mostly in large firms, and there is a possibility that small firms register expenditures in non-R&D activities as if they were R&D (called a relabelling effect).</p> <ul style="list-style-type: none"> • This instrument is a market-based intervention. 	<p>revenues foregone by the R&D tax incentive. In the European Union, tax support for R&D was estimated at 0,1% of GDP in 2019 (Ibid).</p>	
Demand-side	Public procurement for R&D	<ul style="list-style-type: none"> • As mentioned above, firms can invest suboptimally in R&D when faced with uncertainty regarding the appropriation of profits that result from their inventions and the size of the market for their products. • The government purchase of innovative goods and services – which is done primarily to meet demands by the public sector – can have secondary effects of fostering R&D in firms by signalling the existence of demand for their products and by partially funding their research activities through the contracts that result from successful tenders. • Governments must be aware of the difficulties and risks of setting up procurement processes for innovation (see next column) (OECD, 2022b) • Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Public procurement naturally proceeds from the budgetary allocations to the agency that sets up the tender. Therefore, the financing will come from the national or local government's budget. • Given the difficulty of setting up a process of public procurement for products or services that are not available in the market, researchers recommend that tenders are structured around needs and not around technologies (Ibid). This involves creating state capacity in the procuring agencies. • Also, there is a risk that public procurement for R&D induces the development of products that are too narrowly focused on public sector needs and that do not have a broader market application. Hence, it is recommended that governments use public procurement for R&D in areas in which the government encompasses the final demand (e.g. defence or infrastructure) (Ibid). 	High-income countries
	Recurrent impact evaluation of public expenditure programs	<ul style="list-style-type: none"> • In a context of reduced fiscal space, the opportunity costs of public expenditures becomes a central issue. At the same time, structural transformation policies use public resources to invest in activities that are high-risk and experimental by nature (e.g. R&D projects). For both of these reasons, national financing strategies benefit from having recurrent feedback mechanisms that promote learning, adjusting and understanding the direction in which public spending has the most impact. • The development of INFF is usually informed by a variety of assessments and diagnostics, including the use of public expenditure reviews and impact evaluations (UN DESA, 2022). • This instrument is a governance mechanism that seeks to introduce learning and monitoring. 	<ul style="list-style-type: none"> • Impact evaluations and public expenditure reviews can be financed by the national budget. However, rigorous impact evaluations or review studies are resource and time-intensive, which means that most LDCs and even middle-income countries tend to prioritise investing in other, more seemingly urgent areas of policy, leading governments to under-invest in evaluation. • In consequence, there is a general opportunity for international cooperation from donors and multilateral development banks, which can use non-refundable facilities to fund strategic impact evaluations that help build capabilities in these countries, develop tools to inform the overall structural transformation strategy, and produce evidence around the best uses of limited public resources. 	Overall relevant
Governance	Public and private fora to monitor investment performance	<ul style="list-style-type: none"> • Government-led investments in structural transformation (especially those done through public incentives for firms) carry performance and transparency risks. • On the one hand, public agencies do not specialise in the talent and methods that private organisations (like VC or private capital funds) have to assess project proposals or business models. On the other, private stakeholders can be wary of the incentives that are at play when public officials select the beneficiaries of investments. • Therefore, mixed fora in which public officials and private sector representatives meet to monitor the performance of public investment in programs for structural transformation can help create capabilities in public agencies as well as increase trust and transparency in the process of allocating public funds. • This instrument is a governance mechanism that seeks to introduce accountability and transparency. 	<ul style="list-style-type: none"> • A public-private forum generally does not require significant funding, and activities like those of a secretariat and logistics can usually be co-financed by the hosting public agency and/or a hosting private organisation. 	Overall relevant
	Public reports on the scale of tax incentives as well as adoption and effectiveness	<ul style="list-style-type: none"> • The correct quantification of the fiscal costs and estimated benefits of tax incentive schemes is critical for accountability and evaluation of the use of these instruments in the tax system. • Tax authorities and Ministries of Finance should aim to produce routine reports on the scale of tax incentives as well as its measured adoption and effectiveness. 	<ul style="list-style-type: none"> • Tax incentives reports do not require significant funding, although its measurement requires adequate capacities within the tax authority agency and the Ministry of Finance. • International bodies could provide assistance to governments in adopting standardised methods for accounting of tax support for businesses. 	Overall relevant
Vertical Scope				
Supply-side	Management and technology extension programs	<ul style="list-style-type: none"> • Low absorption capacity in firms is usually associated with a lack of managerial abilities and technological literacy within companies. • Management extension programs provide training and assistance to increase managerial capacity. • Technology extension programs provide support for adoption of modern techniques and technologies. • Extension programs can be targeted to specific industries, as has been usually the case in agriculture, but growingly in manufacturing and services. • Hence, the instrument is a sectoral public good that provides access to inputs. 	<ul style="list-style-type: none"> • Funding of management and technology extension programs is generally done by multiple actors, involving public expenditures from national or federal budgets, public expenditures from local or state governments, and private resources from beneficiary firms. • The importance of public expenditures tend to be greater in low and middle-income countries where firms face information asymmetries and tend to under-invest in extension services (as in Morocco or Chile). • Private funding tends to increase in high-income nations (as in Japan or the US) 	Least developed countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
	Technology-specific STEM skills mapped by industries	<ul style="list-style-type: none"> • STEM skills can be specific to technologies that are used in an industry, and, therefore, sectors can have demand for different engineering or scientific competencies. • Public expenditure in high quality public and private training programs that are tailored for those technology-specific skills can increase the supply of specialised talent needed for "between" sector productivity growth, as well as increase high-wage jobs. • Hence, the instrument is a sectoral public good that provides access to inputs. 	<ul style="list-style-type: none"> • Investment for sector STEM skill programs is traditionally channelled to training institutions or university programs. • The source for expenditures can partially come from the national government's budget. Local or state governments can also fund these agencies. • Private sector associations can fund both the training programs and the mapping of skills needed in a specific sector. 	Middle-income countries
	Targeted research infrastructure	<ul style="list-style-type: none"> • Even though public expenditure in research laboratories and PhD training and attraction programs are a common feature of successful structural transformation policies, fiscal restrictions can limit a country's ability to pursue a strategy that has enough "critical mass" in these types of investments. • Therefore, one alternative for low or middle-income countries is to embark on public expenditure programs to provide access to research infrastructure for selected sectors or areas of R&D. • Nonetheless, governments need to be aware of the limitations and risks of such an approach (see next column). • The instrument can be considered a sectoral public good that provides access to inputs. 	<ul style="list-style-type: none"> • As mentioned above, basic research infrastructure is mostly funded by public expenditures in lower stages of development. • In this context, governments must be aware of the limitations they face when pursuing targeted expenditures given the difficulty of identifying which areas of research or technology development are the most promising in any given time and location (Thun et al., 2022). • One way to address this is to carry out "horizontal" or broadly based investments, and then target the program in a second phase on those sectors or areas that showed to have the most impact in terms of additional funding or research outputs on the first phase (OECD 2022b). 	Middle-income countries
	Place-based grants for R&D and innovation	<ul style="list-style-type: none"> • Place-based strategies are increasingly common in modern structural transformation policies because comparative advantages for trade are often connected to features of a location (as in the view of cluster competitiveness in the Porter sense). • In line with this, grants for R&D and innovation are sometimes tailored according to regional priorities and level of specialisation, as is the case with the European Union's S3 platform or the cluster strategies that are prevalent in Latin America (Linás, 2021). • There is strong evidence that subsidies and grants for R&D increase firm outcomes in small and young firms (including effects on patents, VC funding and early-stage survival) (OECD, 2022b). This suggests that these subsidies help address information asymmetries that exist for investors and firms. • It is notable that the mechanism through which these subsidies seem to work (solving information asymmetries) could be addressed by other, less costly alternatives to R&D subsidies (see next column). • This instrument is a market-based intervention. 	<ul style="list-style-type: none"> • Grants and subsidies for R&D are funded by public expenditures from a variety of government levels, with most financing coming from the national government's budget. • However, in the case of place-based incentives, there is an opportunity to leverage national funds with co-financing from local governments and private organisations (for example, those that support cluster initiatives). • Also, given that targeted grants seem to work mostly by "crowding in" private investment, governments could consider complementing or substituting these subsidies with financial instruments designed to address information asymmetries for small and young firms in VC or banking, and which are less costly in terms of public funds (see Table on Public development banks). Those financial instruments could be targeted to the locations that are affected by market failures. 	Middle-income countries
	Targeted grants for R&D and innovation	<ul style="list-style-type: none"> • Grants for R&D and innovation are sometimes targeted to sectors and industries that are prioritised because of a national economic strategy (as in South Korea), because of its importance for climate change (as in the Green Deal and Horizon Europe programmes in the European Union), or because of strategic autonomy (as in the CHIPS and Science Act in the United States). • In fact, this last case of the CHIPS and Science Act of 2022 sparked a renewed global discussion about the role of targeted subsidies for R&D and about modern industrial policies in advanced economies. • In the case of LDCs or middle-income countries, fiscal restrictions can limit the ability to pursue a strategy that has enough "critical mass" in these types of investments, thereby leading governments to embark in R&D subsidy programs for selected sectors. • As discussed in the place-based approach, there is strong evidence that targeted subsidies and grants for R&D increase firm outcomes, especially in small and young firms (OECD, 2022b). • This suggests that these subsidies help address information asymmetries that exist for investors and firms. Hence, the mechanism through which these subsidies seem to work (solving information asymmetries) could be addressed by other, less costly alternatives to R&D subsidies (see next column). • In a more general sense, R&D subsidies for sectors such as defense are described by some authors as strategic because of their technological spillovers to other sectors (e.g. software or semiconductors) (Mazzucato, 2011). In the same light, R&D grants for green energy investments have been an 	<ul style="list-style-type: none"> • Grants and subsidies for R&D are funded by public expenditures from a variety of government levels, with most financing coming from the national government's budget. • In the case of governments with restricted fiscal space, it is noteworthy that targeted grants seem to work mostly by "crowding in" private investment, so public officials could consider complementing or substituting these subsidies with financial instruments designed to address information asymmetries for small and young firms in VC or banking, and which are less costly in terms of public funds (see Table on Public development banks). Those financial instruments could be targeted to the sectors that are affected by market failures. • In countries with more fiscal capacity or more generally in advanced economies, programs for R&D subsidies at scale can increase productivity in strategic sectors that are deemed to have technological spillovers to the rest of the economy, or that are important for their energy transition and decarbonization objectives. 	High-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
		<p>important feature of sustainable structural transformation policies in recent years, and subsidies for the development and manufacturing of vaccines was a key policy in addressing the COVID-19 crisis.</p> <ul style="list-style-type: none"> This instrument is a market-based intervention. 		
	Sector-specific tax incentives or incentives with a technological bias	<ul style="list-style-type: none"> Tax incentives for business investment or R&D are sometimes targeted to sectors and industries that are prioritised because of a national economic strategy, because of its importance for climate change, or because of strategic autonomy. In the case of LDCs or middle-income countries, fiscal restrictions can limit the ability to pursue a strategy that has enough "critical mass" in these types of tax expenditures, thereby leading governments to embark incentives for selected sectors only. As discussed above, tax incentives for investment and R&D in sectors have been shown to increase employment, output and productivity. However, they have been found to be less effective in small firms that lack skilled labour and to induce firms to reduce the quality of their investments (OECD, 2022b), which must be taken into account by governments. Also, they induce "horizontal" inequalities in the tax code between economic sectors, and pose the same risks as sector-based subsidies, in that they can impede competition or have unintended consequences (see next column). This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Governments must be aware of the limitations and possible unintended effects of pursuing targeted tax incentives (e.g. effects on competition or excluded firms), unless there is a clearly defined market failure that can be addressed by the tax incentive, especially in a context of limited fiscal resources in which funds could be directed to more broadly impactful programs. Therefore, these instruments require capabilities in the public agencies that adopt them. Also, targeted tax incentives induce "horizontal" inequality in the tax code as they mean that firms that are comparable but only differ in the sector that they belong to will face different corporate tax rates. Finally, governments must be aware of the difficulty of identifying which sectors or areas of technology development are the most promising in any given time and location (Thun et al., 2022). One way to solve this and build capacity for targeted tax incentives is to carry out a first phase in which the tax expenditure is horizontal, then evaluate what are the characteristics of the beneficiaries where the policy has the most impact, and then carry out a second phase where the incentive is targeted to those. In this targeted phase, the whole industrial ecosystem surrounding the selected sector (e.g. key upstream and downstream firms or adjacent service providers) should be included in the instrument. Tax incentives for specific sectors are financed by the national government's budget, given that they represent a cost in the form of reduced tax collection (though the same caveats as in horizontal incentives apply). 	Middle-income countries
	Open innovation initiatives	<ul style="list-style-type: none"> In some sectors, firms require innovative solutions in products or in inputs that they source from upstream providers, but don't have the R&D capacities to invest in development projects for these necessities. At the same time, smaller or less established firms that could provide those solutions face credit constraints and externalities that limit their ability or willingness to invest in R&D, especially when there is uncertainty regarding the appropriation of profits that result from their inventions and the size of the market for their products. Open innovation schemes tend to solve these market and coordination failures. In this scheme, "client" firms can define and communicate their R&D needs and open a tender for proposals. "Supplying" firms can then submit development proposals for these requirements, and the client undergoes a funding contract with the selected firms to develop their project and source their required solutions (either by licensing or acquiring the invention). Government programs can have a role in fostering open innovation schemes by providing coordination for the sectors that could benefit from these initiatives, or by partially funding activities in the process or investments in R&D by the supplying firms. Hence, this instrument is a market-based intervention. 	<ul style="list-style-type: none"> Open innovation initiatives are traditionally funded by private firms that finance, licence or acquire the solutions that were developed. An open innovation program that is sponsored by a government agency generally does not require significant public funding, apart from those that subsidise the coordination of the initiative. In some cases, however, governments can choose to partially subsidise the "client" firm's process for structuring the requirements in the tender or partially fund the R&D investments by the "supplying" firm. 	Middle-income countries
Demand-side	Public procurement with a technological bias	<ul style="list-style-type: none"> Throughout the past decades, some governments have sought to support their defense, strategic autonomy or climate change objectives through public procurement of R&D for specific technologies (e.g. green energy infrastructure, hydrogen production facilities, or defense technologies in general). The logic for this instrument is that public purchase of innovative goods and services -which is done primarily to meet demands by the public sector- can have secondary effects of fostering R&D in firms by signalling the existence of demand for their products and by partially funding their research activities through the contracts that result from successful tenders. Given the nature of public procurement processes that target a specific technology, governments must be aware of the difficulties and risks of setting up procurement processes for targeted technologies (see next column) (OECD, 2022b) This instrument is a market-based intervention. 	<ul style="list-style-type: none"> Public procurement naturally proceeds from the budgetary allocations to the agency that sets up the tender. Therefore, the financing will come from the national or local government's budget. Given the difficulty of setting up a process of public procurement for products or services that are not available in the market, researchers recommend that tenders are structured around the functional characteristics that are needed from a technological breakthrough and not around the technical and material standards of these technologies (Ibid). This involves creating state capacity in the procuring agencies. Also, there is a risk that public procurement for R&D induces the development of products that are too narrowly focused on public sector needs and that do not have a broader market application. Hence, it is recommended that governments use targeted public procurement for R&D in technologies in which the government encompasses the final demand (e.g. 	High-income countries

Channel	Instrument	Why is it important?	Who pays for it?	When is it more relevant?
			defence or infrastructure) (ibid).	

4.7 Case studies for financing strategies in structural transformation policies

To highlight the implementation of comprehensive and integrated strategies in these policy areas, we develop country case studies for the Republic of Korea and Colombia.

The South Korea case study highlights the role of technology policies in shifting from a traditional industrial policy to a green sustainable transformation strategy, by laying out the policy mix used to facilitate such adaptation (Box 1).

Box 1. Republic of Korea Case Study: the shift to a green growth policy

The Republic of Korea's (ROK) economic performance remains a source of inspiration for developing countries. ROK's export-led industrialization model allowed the country to go from being one of the poorest nations in the world at the beginning of the 1960s to achieve high-income status just a few decades later. During that period, ROK was able to successfully combine rapid economic growth with significant poverty reduction.

By moving beyond traditional manufacturing activities to the production of more complex, sophisticated, and innovative products and services (e.g., information and communication technologies, smart infrastructure), ROK real gross domestic product has grown on average 5.5 percent annually between 1988 and 2019 (Yusuf, 2015). ROK's economic success has been the result of deliberate national development strategies and complementary policy interventions, which have supported the modernisation and technological upgrading of national industry and the creation of domestic scientific and technological capabilities (OECD, 2012).

More recently, ROK has focused its efforts on promoting a green growth agenda to tackle climate change and find new economic growth drivers, as manufacturing-driven and export-led growth started to show its limitations (GGGI, 2015). Through a centralized, top-down approach, with effective leadership from the national government, the country established a Presidential Committee on Green Growth in 2009, enacted the Framework Act on Low Carbon Green Growth in 2010, formulated the National Strategy for Green Growth (2009-2050), and presented the 2050 Carbon Neutral Strategy in 2020. Other plans and strategies have also been conceived to foster green growth in the country.

This shift has implied deep institutional changes and the development of new incentives, programs, and R&D agendas to promote industries and sectors related to energy efficiency, sustainable transportation, energy storage, sustainable construction, among others. It also means that traditional industries need to reduce their environmental externalities, such as the steel, chemical and petrochemical industries, and become more environmentally sustainable.

To finance its green growth objectives, ROK makes use of taxation and other fiscal instruments to increase government revenue and create incentives for producers and consumers to go green: taxes on energy consumption, carbon pricing through an emissions trading scheme, road congestion charges and taxes on vehicles, and charges on environmental pollution and the use of resources (OECD, 2017). The funds collected by those means are then used in fostering green growth through public expenditure programs on environmental protection, energy efficiency and renewable energy, water supply and sanitation, sustainable transportation, and other related green initiatives. The national government also fosters the expansion of environmental-related markets through demand-side instruments, like green public procurement, and the support of environmental consumption (OECD, 2017).

Promoting green growth entails supporting the development of technological capabilities of firms and laying out the policy mix necessary to facilitate such learning, especially small- and medium-sized enterprises (SMEs), the backbone of ROK's economy. SMEs take up ninety-nine percent of the number of enterprises in the country, eighty-two percent of total employment, forty-eight percent of export, and forty-nine percent of business revenue (MSS, 2022).

To promote technological capabilities, the ROK's government has put in place an entire ecosystem that serves SMEs and intends to strengthen their competitiveness and innovation. Coordinated by the Ministry of SMEs and Start-ups (MSS), the ecosystem is composed of several affiliated institutions (Figure 5). These institutions work together with businesses to improve their managerial practices, innovation processes, access to venture capital markets and technology financing, and find new markets and distribution channels for their products and services, among other activities.

Figure 5. Ministry of SMEs and Start-ups and Affiliated Organizations



Source: Ministry of SMEs and Startups, Government of Korea.

As part of their tools to foster green growth, MSS's affiliated institutions and other government ministries and agencies use different financing policy instruments to expand SMEs' access to financial resources (e.g., loans, matching grants, R&D grants, loan guarantees, and bonds) (see Table 1 in the Annex). These financing tools are designed to foster new growth engines based on green technology and clean energy, and with reduced environmental impact.

In sum, the case of ROK's green growth strategy is a showcase of a country's ability to shift from a traditional industrial policy, based mostly on trade and public expenditure instruments, to a modern structural transformation policy that can help sustain growth and introduce environmental sustainability as a principal feature of development.

The Colombia case study highlights the effort of a middle-income country with limited state capabilities to design and finance a comprehensive sustainable industrialization policy, laying out the role of financing policies across the Addis action areas (Box 2).

Box 2. Colombia Case Study: a developing country's approach to financing structural change

The past two decades have been a period of evolution and reform in Colombia, a middle-income country with a proven record of macroeconomic stability, but a dependence on mining and oil production as well as commodity exports (OECD, 2019). After being affected by domestic violence problems and crippling financial crisis in the 90s, Colombia adopted institutional and structural changes in the early 2000s to consolidate a sound monetary and fiscal policy framework. The Colombian government also concentrated on setting up the horizontal framework conditions for business investment, competition, and financial development, and created a public-private governance mechanism called the National Competitiveness System to oversee inter-agency coordination and to collaborate with private sector organisations in identifying priorities. Coupled with the qualitative improvements in security and an international commodity price surge, this new approach triggered high flows of foreign and domestic investment and accelerated economic growth.

However, by 2010 there was still an over-dependence on mining and oil and traditional agriculture products like coffee, flowers, and bananas. Manufacturing, agribusiness, and service exports were stagnant, and the economy was showing signals of suffering from a Dutch-disease, with an appreciated real exchange rate and with rising investments and prices in non-tradable sectors. Until that point, most of the policy efforts had concentrated on high-level coordination and horizontal reforms (apart from its flagship 2008 *Programa de Transformación Productiva* [*productive transformation program*], which tried to solve bottlenecks for specific high-potential sectors), and industrial policies still carried a negative connotation in economists and policymakers because of the pitfalls of import substitution and State-led enterprises thirty years back (Ocampo & Valdés, 2022).

Starting in 2011, Colombia began to implement reforms to address its lack of productive diversification, and did so with financing efforts in several action areas. That year, Congress approved a constitutional reform of the *Sistema General de Regalías* (the sovereign royalties from mining and oil production), and defined that 10% of these revenues would be allocated to finance science, technology, and innovation projects. According to the Law, the objective of these funds is to contribute to the “production, use, integration, and appropriation of knowledge in the production apparatus [...] in order to promote economic dynamism and sustainable growth”. Since

its conception in 2012, this STI Royalties mechanism has financed over USD 940 million in R&D or innovation projects (OCYT, 2021), and the funds have an explicit allocation for all departments (Colombia's subnational governments) to induce an inclusive development of innovation capabilities.

Then, in 2012 a new fund called iNNpulsa was created with Government resources accounting for nearly USD 40 million, with the objective of supporting entrepreneurship and innovation in small and medium enterprises through R&D and innovation grants, entrepreneurship support and mentoring. The fund is managed by Bancoldex, a public development bank, and each year a set percentage of the bank's earnings are injected into iNNpulsa. These efforts, although small in scale, represented a new role for Bancoldex and a novel focus on high-impact entrepreneurship and innovation.

Finally, in 2015 the government promoted a legal reform that simplified and expanded the tax expenditure instruments included in the tax code, and put in place a national policy to promote a broad adoption of these incentives by small and medium firms. After these reforms, the tax code offers deductions and exemptions for R&D and innovation expenditures; wages and expenditures for PhD and highly skilled workers; VAT exemption for equipment imports, and deductions for private donations in PhD scholarships and R&D projects. Crucially, it allowed for a tax credit that boosted the appeal for early-stage firms that were still not required to pay income tax, but could benefit in the future. In 2016, businesses reported USD 164 million in annual expenditures benefited by these tax incentives, which rose to USD 267 million in 2021 (Ibid).

These financing efforts resulted in an expansion of public R&D funding through non-budgetary sources (transfers from mining and oil royalties, development bank equity and foregone tax revenues), which in turn has leveraged increased private funding of R&D expenditures. Together, these two effects have helped Colombia double its STI investments from 0,5% of GDP in 2012 to 1% of GDP in 2021. Nonetheless, they have proven to be insufficient: the R&D intensity (a more focused measure of innovation expenditures) is still only about 0,26% of GDP and the boost to non-budgetary funds has resulted in a relative stagnation in the fiscal budget for R&D public expenditure programs.

Apart from its financing strategy for STI and its horizontal reforms, up to 2015 Colombia did not have a formal structural transformation policy. So in 2015, the National Development Plan 2014–2018 gave a mandate to create a productive development policy with the explicit objective of increasing productivity, sophistication and diversification, which was materialized in the *Política de Desarrollo Productivo* (productive development policy or PDP) of 2016. This structural transformation policy gives agencies guidelines on how to embark in horizontal and vertical initiatives, and is focused on addressing market and governance failures that affect firms, and reducing coordination failures between national and regional governments, as well as between the public and private sectors. Even though the PDP allows for targeted instruments and sets an objective methodology to identify promising sectors jointly with regional authorities, it excludes the use of market-based interventions to foster these sectors, favouring the provision of sectoral public goods that could be less prone to political capture and state intromission in markets. Finally, the PDP creates a public-private high-level commission that works in conjunction with the *Sistema Nacional de Competitividad e Innovación* to monitor policies and investments, verify the compliance of guidelines, and evaluate results.

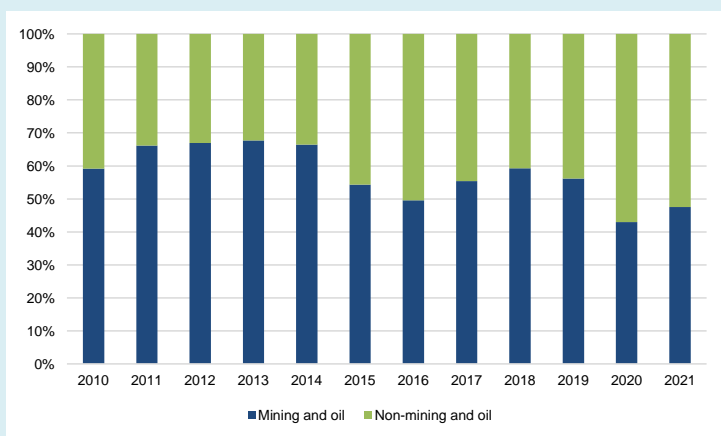
At the beginning of 2019, the PDP commission asked the OECD to evaluate the initial implementation of the policy (OECD, 2019). In particular, the evaluators recommended introducing a more forward-looking approach to global technological trends and risks, making better use of trade agreements available, connecting companies to GVC and attracting knowledge-intensive foreign direct investment.

Since the creation of the PDP, several other complementary policies have been put in place, including the *Política de Crecimiento Verde* (green growth policy) of 2018, the *Política Nacional para la Transformación Digital e Inteligencia Artificial* (digital transformation and AI policy) of 2020, and the *Política Nacional de Ciencia, Tecnología e Innovación* (STI policy) of 2021, among others.

Even though these policies and financing strategies are still in their early stages, some promising signs are beginning to emerge. Though between 2005 and 2018 Colombia had negative TFP growth (with productivity decreasing -0.05% on average per year), this trend has reversed and TFP growth has topped 1% average per year from 2019 to 2021 (DANE). At the same time, commodity exports of oil and mining are still dominant in the country's trade flows, but non-oil and mining exports have increased significantly since 2018 and now represented 52% of total exports, up from its share of 33% in 2012 (Figure 6). The entry of ICT products and services into the top five export products is notable, surpassing coffee exports, equalling gold and almost on the level of coal.

Figure 6. Colombia has started to change its composition of exports towards non-mining and oil products and services.

(Share of mining and oil to non-mining and oil exports, % of total exports)



The case of Colombia shows that, in the face of slow productivity growth and stalling exports in non-traditional goods and services, the government and the private sector have pursued a series of encompassing financing reforms, governance coordination mechanisms and industrial policies to increase financing and foster structural change in a sustainable and regionally inclusive manner.

5.0 Lessons learned and policy recommendations

Modern structural transformation policies are starting to go well beyond the traditional fiscal tools of public spending and tax incentives. This new breadth and scope of the industrial policy toolkit also implies that the implementation of structural transformation policies requires investments at scale. Addressing this issue proves to be particularly difficult for developing nations, which have limited fiscal space.

A structural transformation policy therefore needs to be formulated and implemented beyond the scope of Finance Ministries, and requires deeper integration across ministerial portfolios. This paper argues that industrial policies need a financing framework, and provides guidance on how countries can finance their industrial strategies. To do so, we characterize the challenges that governments face when funding structural transformation initiatives, and present the basis for a financing strategy that includes a toolkit of policy instruments for each of the action areas of the Addis Ababa agenda, with funding considerations and alternatives for governments.

INFF can be an effective way to put in place such a comprehensive financing strategy. A financing strategy based on INFF identifies the action areas of a diverse set of financing actors, maps specific policy instruments to each of these action areas and designs funding strategies for each instrument which effectively involve the relevant actors.

A financing strategy based on INFF, and the lessons derived from the case studies, highlight some of the features required for effective implementation of industrial policies:

- **First, INFF can serve as a tool to gather the investments needed** to make structural transformation objectives a reality, by helping to crowd-in different actors and sources of financing.
- **Second, it can help governments learn and undertake a path of increasing state capabilities,** as well as understanding of the relevant instruments for each stage of development.
- **Third, it can “discipline” governments** in setting up rigorous design mechanisms and evaluation routines, critical for the kind of experimentation that industrial policies entail.
- **Fourth, it allows governments to better comprehend the complementarities** between instruments that arise from different ministries, agencies, and areas of government. As seen in the different action areas, there are key complementarities in several fronts:
 - Technological and managerial skill training in firms is a key input for tax investment incentives to be effective in smaller firms.
 - Ample research infrastructure and availability of researchers is required for R&D tax incentives to result in increased expenditures and innovation outputs, instead of being fed into researcher wage inflation.

- While R&D subsidies and grants from a public agency are effective at increasing research expenditures, public loans from a development bank are effective at promoting the development expenditures that can help bring those findings and innovations to market.
- There is high complementarity between protection and IP rights and competition, since in a more competitive environment, the reward for an invention and escaping competition is higher.
- **Fifth, it involves the setup of governance mechanisms that allow for a productive collaboration and coordination** with private and civil society organisations.
- **Finally, its governance, monitoring and evaluation features also serve as an accountability tool** that can help governments overcome the risks of political capture and gain legitimacy.

Throughout the paper, state capacity emerges as a cross-cutting theme. On the one hand, investments in civil servant talent training, adoption of concrete instrument design mechanisms and efforts to diminish the “failure dimensionality” of instruments in lower stages of development can help build these state capabilities, and achieve results in a way that helps governments learn and iterate. On the other, international institutions, multilateral development banks and donors can play a role in supporting countries in the path to gain capacities, by providing technical assistance and funding to activities that otherwise would be neglected because of more urgent necessities (like rigorous evaluation of programs).

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Annex

Table A1. Non-comprehensive List of Policy Instruments for Green Financing in ROK

Policy Instrument	Sub	Authority	Type	Purpose
1. Environmental Policy Fund	1.1 Future Environmental Industry Promotion Financing 1.2 Clean Atmosphere Conservation Facility Support Loan	KEITI/ME	Loan Loan	Environmental Improvement Facility Green Industry (Market) Promotion
2. Support for the Spread of Green Finance	2.1 enVinance 2.2 Operation of the Green Financial Experts Forum	KEITI/ME	Information	Green Financing Spread
3. Supporting Commercialization of environmental SMEs	3.1 Commercialization Package 3.2 Environmental equipment commercialization funds	KEITI/ME	Grant (Matching Fund) Grant (Matching Fund)	Green Tech/Product promotion Green Tech/facility promotion
4. Financial Support for the Recycling Establishment	4.1 Financial Support for the Establishment of Recycling Business 4.2 Financial Support for Technical Consulting on the Recycling Industry	K-Eco/ME	Grant (Matching Fund) Grant (R&D)	Nurturing Recycling Industry and Business
5. Support for Greenhouse Gas Reduction Facilities	5. Support for Greenhouse Gas Reduction Facilities	K-Eco/ME	Matching Fund	GHG Reduction Facility
6. Monitoring of Waste and Air	6.1 Allbaro System (Industry waste monitoring) 6.2 CleanSYS (Industry's stack emission monitoring)	K-Eco/ME	Monitoring & DB Monitoring	Environmental Compliance
7. Energy Use Rationalization Fund	7.1 ESCO Investment Projects 7.2 Energy Saving Facility Installation Projects	KEA/MOTIE	Loan	Energy Efficiency and Saving Facility
8. High Efficiency Appliance Certification	8. High Efficiency Appliance Certification	KEA	Certificate	Energy Efficient product promotion
9. Renewable Energy Supporting Fund	9. Renewable Energy Supporting Fund	KEA/MOTIE	Loan	Renewable Energy Facility
10. Green Certificate	10. Green Certificate	KIAT/MOTIE	Certificate	Green Project & Financing Spread

11. Industrial Complex Programs	11.1 Industrial Complex Environment Improvement Fund 11.2 Fine dust and greenhouse gas reduction projects through EID 11.3 Eco-Industrial Park	KICOX/ MOTIE	Equity Investment Matching Fund Grant (R&D)	Industrial Park Improvement GHS and Fine-dust Reduction Facility Project Feasibility Support
12. Green Technology Financing	12.1 Loan Guarantee 12.2 Korea Technical Rating System	KOTEC/ MSS	Loan Guarantee Tech Rating	Improve access to finance
13. SMEs Policy Fund	13.1 Supporting Net-Zero Promising Companies 13.2 Support for Smart Manufacturing	KOSME / MSS	Loan	Green Technology/product commercialization, Green transition
14. Public Green Procurement	14. Public Green Procurement	PPS / MOEF	Procurement	Green Financing Spread
15. Green Financial Portal	15. Green Financial Portal		Information	Green Financing Spread
16. Green Bond	16. Green Bond		Bond	Green Project Financing

Source: EMSUS, 2021.

Note: ME: Ministry of Environment; MOTIE: Ministry of Trade, Industry and Energy; MSS: Ministry of SMEs and Startups; MOEF: Ministry of Economy and Finance; KEITI: Korea Environmental Industry and Technology Institute ; K-Eco: Korea Environment Corporation ; KEA: Korea Energy Agency; KIAT: Korea Institute for Advancement of Technology; KICOX: Korea Industrial Complex Corporation; KOTEC: Korea Technology Finance Corporation; KOSME: Korea SMEs and Startups Agency ; PPS: Public Procurement Service.